OGDEN

LIMITED ENERGY STUDY
COLD STORAGE FACILITY
FT. CAMPBELL, KENTUCKY

Ogden Project No. 0-4627-0070-0000

Prepared for:
U.S. Army Corps of Engineers, Louisville District
600 Martin Luther King Place
Louisville, KY 40201-0059

Prepared by:

Ogden Environmental and Energy Services
11003 Bluegrass Parkway # 690
Louisville, KY 40299

January, 1993

DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
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EXECUTIVE SUMMARY

Introduction. An energy audit was performed at the Cold Storage Facility (Building #5202) at Ft. Campbell, Kentucky, on September 10-11, 1992 by Ogden Environmental and Energy Services. Electrical energy demand and consumption were measured by Tennessee Valley Authority (TVA) personnel between September 18 - October 19, 1992. This draft report presents findings from the survey and results of an analysis of energy conservation opportunities (ECOs) listed in the scope of work or identified during the survey.

Building Data. The Cold Storage Facility (CSF) was designed and built in 1964 as a cold storage and meat cutting plant and encompasses 29,300 square feet. The CSF is presently used as a storage and distribution facility. The meat-cutting area is no longer used as such, because meat is received pre-cut. The facility serves 29 dining facilities, Reserve and Guard Units, schools, and hospitals on post.

Present Energy Consumption. Electricity and natural gas are used at the CSF. Neither is metered. The CSF consumes an average of 2900 kilowatt-hours (KWH) of electrical energy daily. Major electrical loads include refrigeration systems (about 65%), lights (about 28%), and forklift battery charging (about 5%). Demand is generally highest in the early afternoon, and runs about 20% higher during the week than on weekends (167 Kw). Projected CSF annual electricity consumption is 1.1 million kWH, or 3,626 MBTU. CSF electrical consumption is about 0.5% of the total Ft. Campbell electrical consumption. Projected annual CSF electricity cost is approximately $47,500. Natural gas is used to power a boiler and water heaters at the facility. Operating cost is estimated at between $3,000 and $4,000 per year.

Energy Conservation Analysis. Recommended projects for energy conservation include water heater replacement, additional insulation (above ceiling), plastic strip curtains, replacing door seals, heat reclaim, HVAC replacement, shutting down excess capacity, high efficiency motors, and fluorescent lighting.

Projects evaluated and rejected as not feasible or economical include replacement of doors, roof replacement, occupancy sensors on incandescent lights, and power factor improvement.

A major reorganization of operations is recommended which includes putting some refrigeration compartments on standby and revamping the Mini-Mart.

Energy and Cost Savings. Eight projects have been identified to date with technical and economic feasibility. Each project has been analyzed alone, and synergistic effects of 15% have been estimated. The projects have energy or non-energy savings totalling approximately $22,300 per year (1,763 MBTU/yr), nearly half of present CSF energy consumption. Combined investment cost is approximately $317,107.

Recommended energy saving projects are summarized in Table ES-1.

Table ES-1.

Ft. Campbell Cold Storage Facility
Recommended Energy Conservation Opportunities

Energy Conservation Opportunity	Estimated Construction Cost ($)	Estimated Total Investment ($)	Estimated Energy Savings		Other Savings (+) or Costs (-)		Simple Payback Period (yrs)	Savings to Investment Ratio
			(MBTU/yr)	($/yr)	One-Time ($)	Annual ($/yr)		
Replace old water heaters with instantaneous heaters in restrooms and VET office	$1,040	$1,165	133	$148	-	-	7.9	3.3
Replace existing lighting which is mostly incandescent with fluorescent fixtures and lamps.	$26,210	$29,225	425	$5,518	-	($373)	5.3	2.1
Add insulation between compartment ceilings and roof	$15,000	$16,725	145	$2,016	-	-	8.3	1.7
Replace main meat freezer evaporators with updated electric defrost models	$48,000	$53,760	122	$1,700	-	$4,500	8.6	1.5
Install plastic curtains on doors without them and reseal all cooler doors	$6,250	$6,969	54	$752	-	-	9.3	1.5
Install High-Efficiency Compressor Motors on Central Medium and Low Temperature Systems	$7,800	$8,697	64	$897	-	-	9.7	1.4
Replace boiler, install HVAC systems, enclose docks, move forklifts, shut down oleo room, north freezer, free-standing freezer, repipe Mini-Mart Egg and Mini-Mart Produce to make freezers, remove unused equipment from CSF	$127,063	$142,311	742	$9,151	$58,605	-	11.7	1.3
Computerized Control System for HVAC and refrigeration systems	$52,140	$58,397	389	$5,419	-	$3,288	6.7	1.2
TOTAL	$283,503	$317,107	2,074	$26,274	$58,605	$7,415	8.6	1.6
TOTAL ASSUMING 15% REDUCTION IN SAVINGS DUE TO SYNERGISTIC EFFECTS	$283,503	$317,107	1,763	$22,329	$58,605	$7,415	9.7	1.5

7,415
37,044 = 30K

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1.0 Background

This energy study at Fort Campbell, Kentucky, is part of a larger Energy Engineering Analysis Program (EEAP). The study was performed using the Energy Conservation Investment Program (ECIP) Guidance and a Scope of Work based on EEAP guidance.

The study subject is the Cold Storage Facility (CSF), located in Building #5202, on Kansas Avenue between 8th and 11th Streets, Fort Campbell, KY. Fort Campbell is located approximately 200 miles south of Louisville, on the Kentucky-Tennessee border.

An energy audit was performed at the facility on September 10-11, 1992 by Rebecca Corry, Bill Rosen, and Woody Wicker of Ogden Environmental and Energy Services. The audit included a room-by-room survey, personnel interviews, and photographs. Electrical energy demand and consumption were measured by Tennessee Valley Authority (TVA) personnel between September 18 - October 19, 1992. Mechanical engineering support was provided by Richard Kelso, Kelso-Regen Associates.

2.0 Building Data

The Cold Storage Facility (CSF) was designed and built in 1964 as a cold storage and meat cutting plant. Some equipment is original. The facility encompasses 29,300 square feet. The building is concrete block painted tan (top) and brown (bottom). The black built-up roof is flat insulated board with ballast. Photographs of the CSF are included as Appendix 1.

The CSF is presently used as a storage and distribution facility. The meat-cutting area is no longer used as such, because meat is received pre-cut. The facility serves 29 dining facilities, Reserve and Guard Units, schools, and hospitals on post. The facility operates from 07:30 to 16:30, Monday through Friday, although arrangements can be made for emergency opening for food pickups. CSF personnel estimate that a pickup is made on weekends once per month.

Building #5202 contains five custom-built, walk-in refrigerators, three walk-in freezers, a reach-in, glass-fronted freezer, an ice storage room, and an open- top, coffin case freezer (Figure 1). Twenty-two rooms were surveyed (Table 1).

Some rooms presently used as refrigerators were designed as freezers. Sinks, meat conveyors, and some air handling units remain from the original use. The majority of lights are incandescent and left on at all times. Freezer doors are hand-operated, the majority without automatic or magnetic closures. Some freezer doors have plastic strip curtains. Hand-operated electric forklifts are used to move food.

The administrative area (Mini-Mart) has single-unit, exterior windows typical for concrete block structures. This area is heated in winter by a boiler.

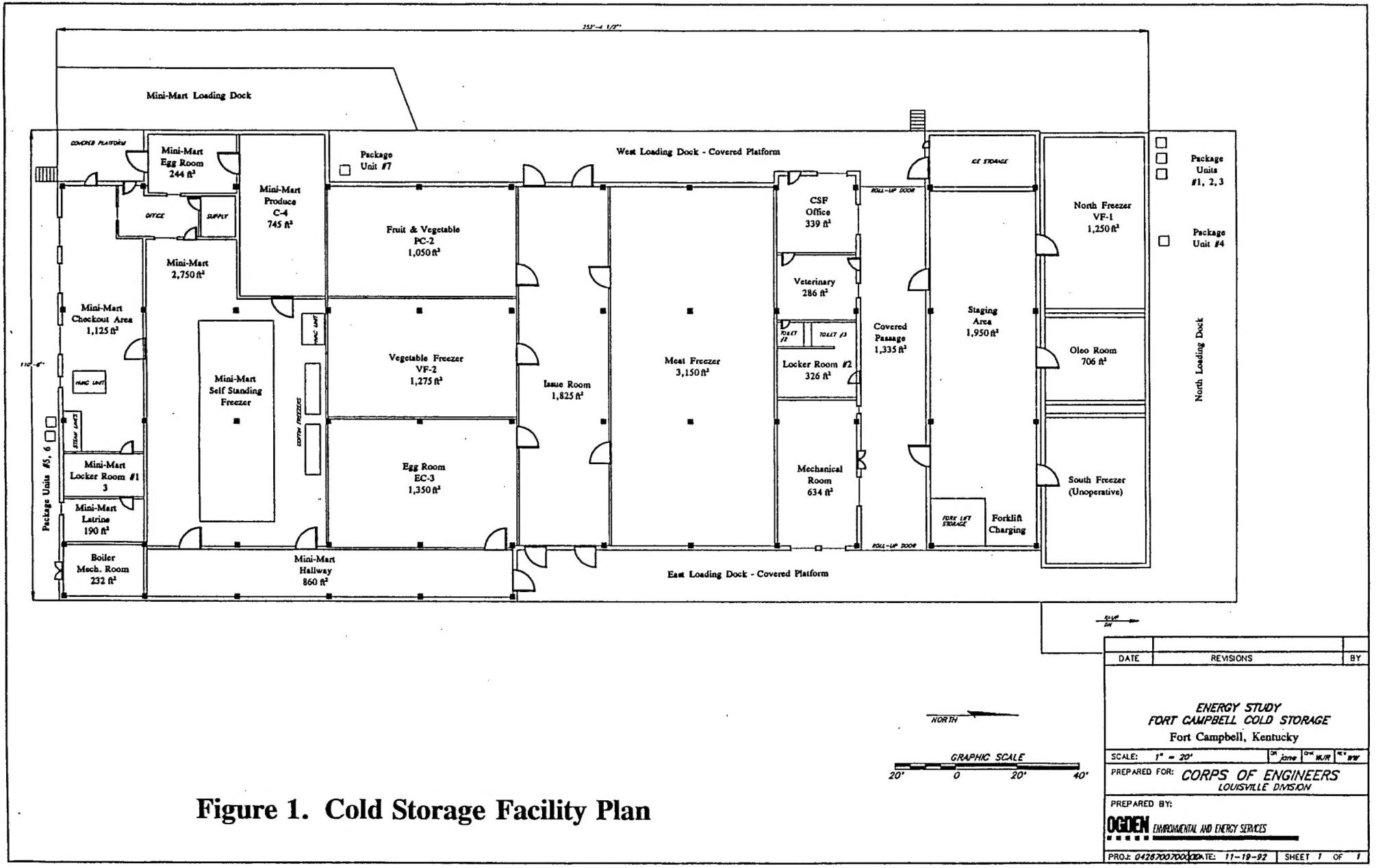


Figure 1. Cold Storage Facility Plan

DATE	REVISIONS	BY

ENERGY STUDY
FORT CAMPBELL COLD STORAGE
Fort Campbell, Kentucky

SCALE: 1" = 20' | DR: jane | CHK: W.R | QC: WW

PREPARED FOR: CORPS OF ENGINEERS
LOUISVILLE DIVISION

PREPARED BY:
OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PROJ: 042670070000 DATE: 11-19-92 | SHEET 1 OF 1

Table 1. Cold Storage Facility Rooms Surveyed

Room	Size (ft2)	Usage	Approximate Loading (%)	Recorded Temp.* (F)	Design Temp. (F)
Egg Room (EC-3)	1,306	Eggs, Cheese, Canned Ham	50%	56	35 - 42
Crushed Ice	270	Bagged Ice	40%	32 - 36	32
Fresh Produce (PC-2)	1,008	Fruits and Vegetables	30%	39	35 - 40
Meat Freezer (MF)	3,034	Frozen Meat, Poultry, Seafood	50%	6	0 to -10
Issue Room (IR)	1,737	Bread, Milk	-	-	-
Cold Storage Office	339	Office and Break Room	-	71	-
VET Office	286	Office and Lab	-	70	-
Locker Room	326	Locker Room	-	70	-
Mini-Mart Hallway (MM-HW)	882	Potatoes, Onions, Packs of Ketchup	-	52	-
Mini-Mart Egg Room (MM-ER)	244	Butter, Margarine, Cheese	25%	44	35 - 42
Mini-Mart Checkout (MM-CO)	960	Customer Checkout, Inventory, Office	-	Ambient	-
North Storage Staging (NSS)	1,921	Stable Milk, Extra Pallets, Forklifts, Carts, Dry Goods	-	Ambient	-
Boiler Room (BLRM)	232	Boiler, Water Heaters, Electrical Panels, Transformer	-	80	_
Vegetable Freezer (VF2)	1,176	Processed Frozen Foods	50%	3	0 to -10
Mini-Mart (MM)	2,952	Frozen Food in Free-Standing Unit and in Coffin Case. produce on floor	40%	49 - 58 in room, 10 in freezer	0 in freezers
South Freezer (non-operable) (SFRE) **	817	Not in use	0%	Ambient	0 to -10
Oleo Room (C-1) ***	466	Shortening, Oleo, Packaged Foods	50%	53	35 - 42
North Freezer (VF1) ***	921	Frozen Vegetables	50%	6	0 to -10
Mechanical Room (MECHRM)	634	Compressors, Evaporators, Electrical Panels, Refrigerant Storage, Water Heater, Transformer	-	84	-
Mini-Mart Produce	745	Fruits, Vegetables, Canned Ham, Potatoes	50%	48	30 - 35
Mini-Mart Locker Room	190	Locker Room	-	75	-
Mini-Mart Latrine	190	Latrine	-	75	-
Total	20,636				

* September 10-11, 1992
** unoccupied or unused
*** candidate for shutdown

3.0 Present Energy Profile

3.1 Ft. Campbell

Energy Usage. Electricity and natural gas are the main forms of energy supplied to Ft. Campbell. Natural gas is provided to Ft. Campbell by Clarksville Gas, and electricity is provided by Pennyrile Electric and the Tennessee Valley Authority (TVA). Billing components from TVA include customer and facility (fixed) charges, an energy charge ($0.02154/kWH), a demand charge ($12.01/kW), and a power factor penalty ($0.78/kVAR). The TVA direct service power rate and the October 1992 electricity bill for Ft. Campbell are included in Appendix 2.

Of the 2.1 million BTUs (MBTU) of energy consumed in Fiscal Year 1991, approximately 35% was electricity and 61% was natural gas. Ft. Campbell's energy bill in FY 1991 was $15.1 million. Of this cost, 68% was electricity and 27% was natural gas. Energy consumption and usage are presented in Table 2.

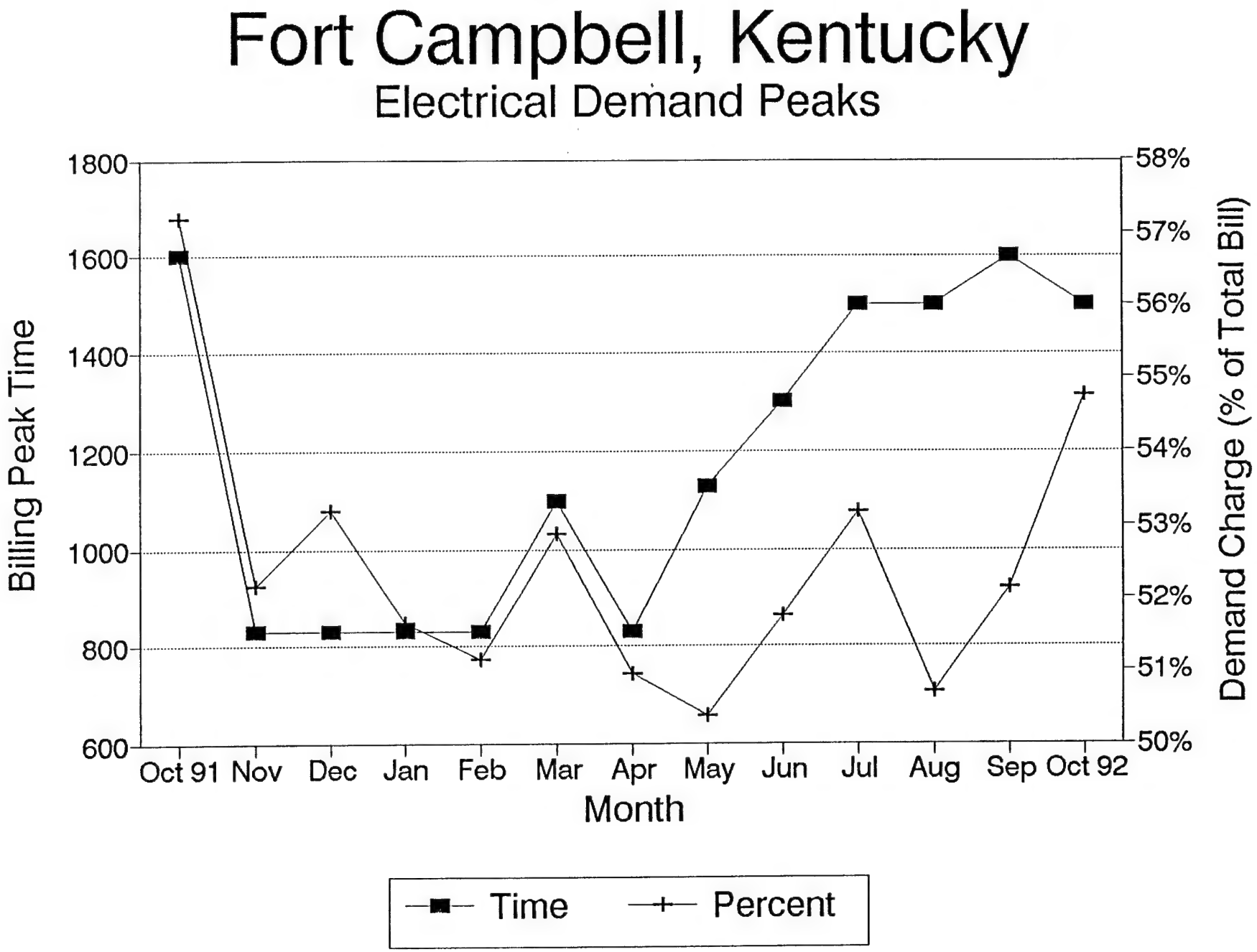
Table 2. Ft. Campbell Energy Consumption

Energy Source	Usage (MBTU)		Cost (Million $)		Price ($/MBTU)	
	1991	1992	1991	1992	1991	1992
Electricity	744,087	795,239	10.3	11.3	13.86	13.93
Natural Gas	1,296,837	1,491,789	4.1	4.9	3.16	3.28
Other	85,038	-	0.8	-	6.91	-
Total	2,125,962	-	15.2	-	-	-

Source: Army Energy Awareness Program, Ft. Campbell DEH
(-) not available

Electrical Demand. More than half of the Ft. Campbell electric bill from TVA in FY 1992 was due to demand charges. Peak demand was recorded in the early afternoon in warmer months and in the morning during colder months (Figure 2).

Figure 2


Fort Campbell, Kentucky
Electrical Demand Peaks
Billing Peak Time
1800
1600
1400
1200
1000
800
600
58%
57%
56%
55%
54%
53%
52%
51%
50%
Demand Charge (% of Total Bill)
Oct 91
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct 92
Month
Time
Percent

Power Factor. Reactive power charge from TVA to Fort Campbell in FY 1992 was $10,590, or 0.1 percent of the total electricity billing from TVA. Fort Campbell has facility-wide power factor correction that results in a small power factor penalty.

3.2 Cold Storage Facility

Energy Usage. Both electricity and natural gas are used at the CSF, but neither is metered. To estimate electrical energy consumption, the TVA measured electrical input to the building between September 18 and October 19, 1992. Electrical metering for the facility was installed for an approximate two-week period on each of three meters: panels in the boiler room, the mechanical room, and the battery charger room. The metering was intended to identify KWH consumption, power factor, and electrical demand peaks over the metering period. Peak demand in kilowatts (kW) and kilovolt-amperes (kVA) was measured on a 30-minute basis. Results of the study are discussed below. The TVA study and related calculations are provided as Appendix 2.

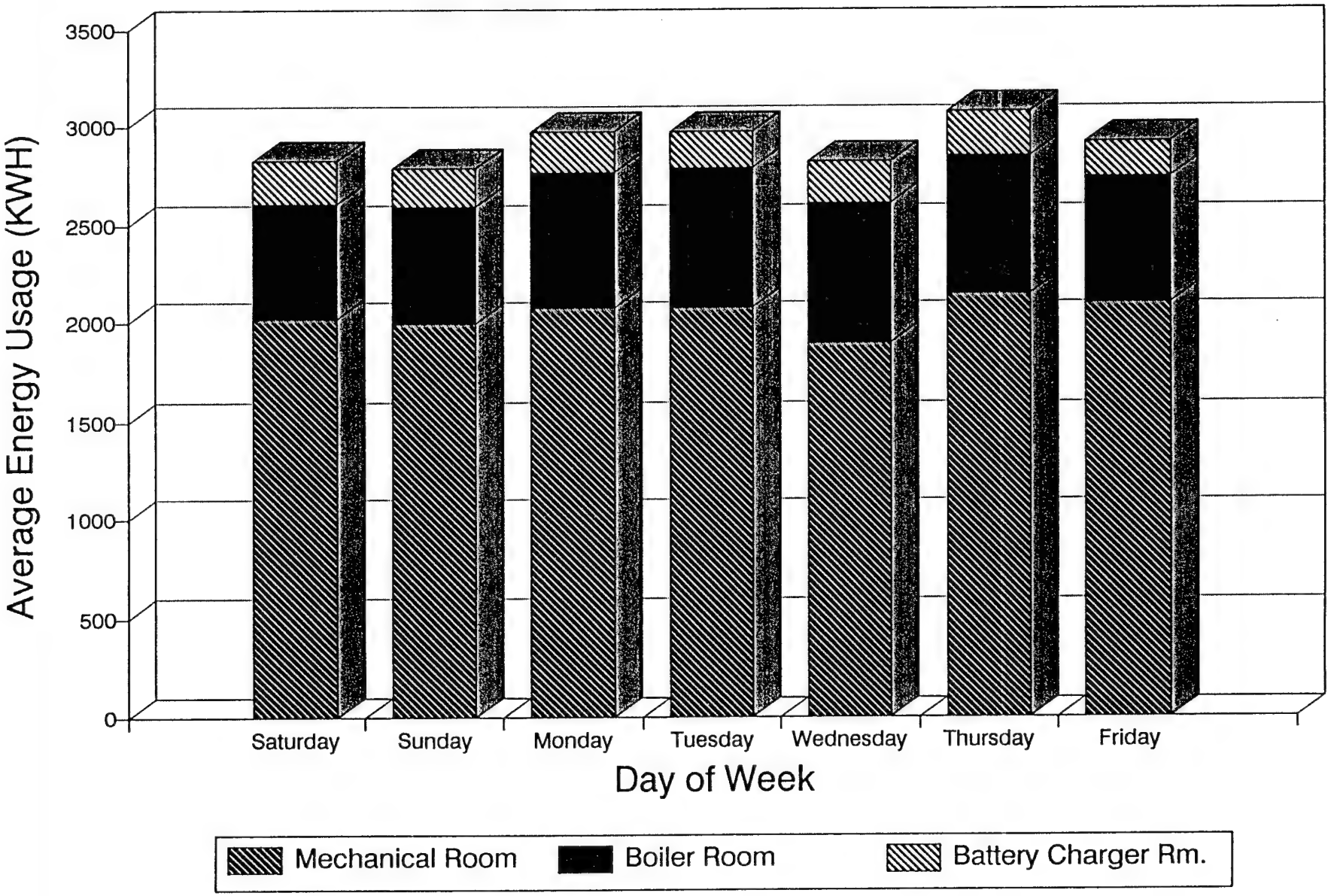
The CSF consumes an average of 2900 kilowatt-hours (kWH) of electrical energy daily (Figure 3). Major electrical loads include refrigeration systems (about 65%), lights (about 28%), and forklift battery charging (about 5%).

Projected CSF annual electricity consumption is 1.1 million kWH, or 3,626 MBTU. CSF electrical consumption is about 0.5% of total Ft. Campbell electrical consumption. Projected annual CSF electricity cost is approximately $47,500.

Natural gas is used to power a boiler (cold weather only) and water heaters at the facility. CSF usage of natural gas was not metered for this study. Operating cost is estimated at between $3,000 and $4,000 per year.

FORT CAMPBELL COLD STORAGE FACILITY
DAILY AVERAGE ENERGY USAGE

Figure 3

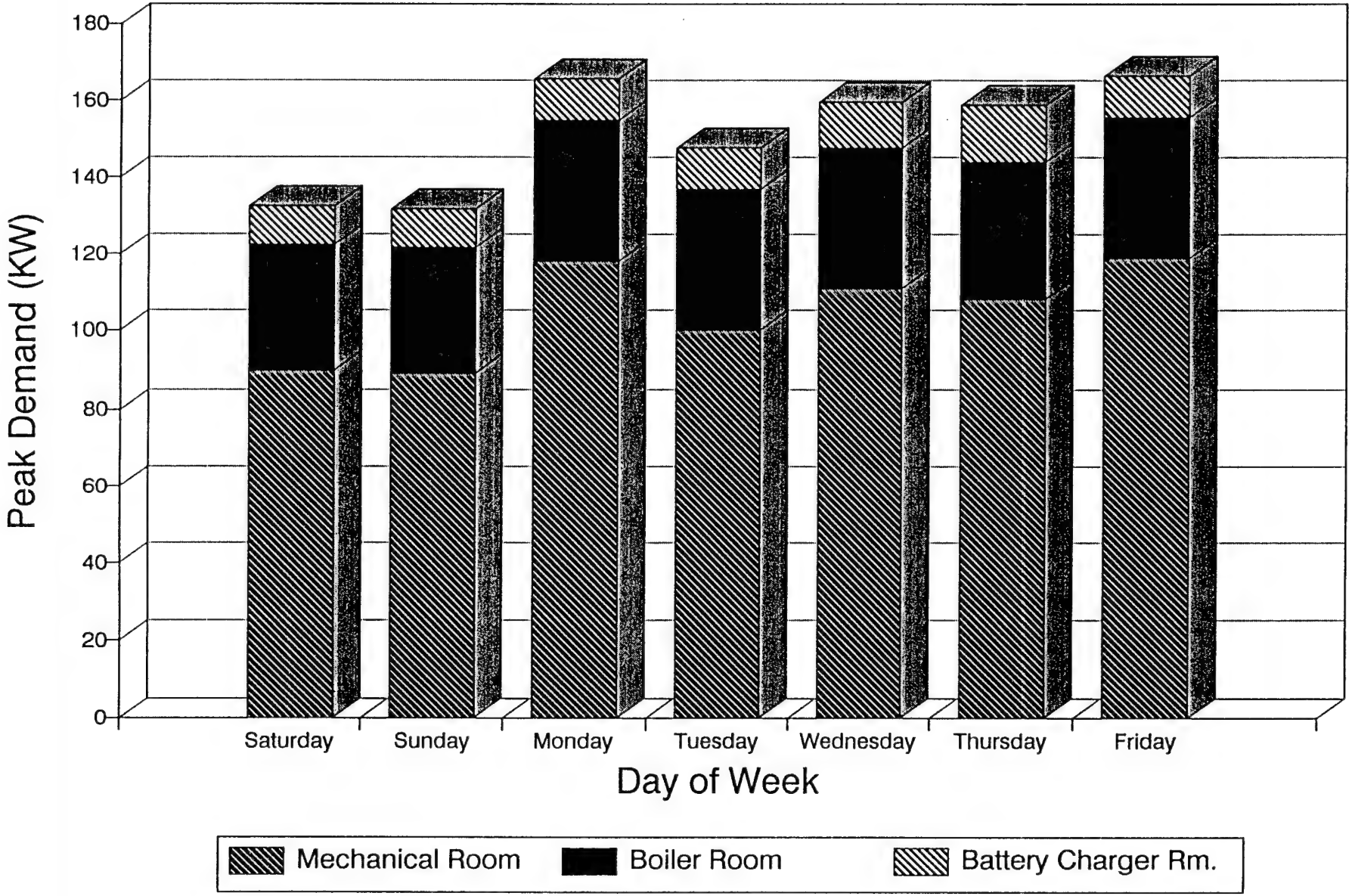


Electrical Demand. Demand is generally highest in the early afternoon, and runs about 20% higher during the week than on weekends (Figure 4). Peak demand occurred on Friday afternoons (167 kW).

Power Factor. Power factor measured on the circuits at the CSF ranged from 69 to 99 percent; the average for the mechanical room circuit, however, was in the mid-70 percent range. As mentioned above, Ft. Campbell has an installation-wide power factor correction that compensates for this lagging power factor.

FORT CAMPBELL COLD STORAGE FACILITY
DAILY PEAK DEMAND (KW)

Figure 4



4.0 Energy Conservation Analysis

This section describes the energy conservation opportunities evaluated at the Fort Campbell Cold Storage Facility. The study analyzed the existing use of electricity and natural gas. Alternative energy sources --such as solar, wind, and geothermal,-- were not included. The study considered various potential energy conservation opportunities (ECOs) as well as new designs for energy trends that could make the cold storage facility more cost effective and energy efficient. Section 4.1 summarizes the ECOs evaluated and their status, i.e., whether recommended or rejected. Section 4.2 discusses recommended ECOs. Section 4.3 discusses recommended maintenance and repair actions, whether or not energy savings potential exist. Section 4.4 discusses operational recommendations. Section 4.5 gives justification for rejected ECOs.

ECOs were evaluated on the basis of potential energy savings and cost. Justification for recommending or rejecting an ECO can be for technical, economic, or operational considerations. Consideration was given to facility upgrade when possible to justify the upgrade economically.

Economic analysis uses the Army's Life Cycle Cost in Design (LCCID) software. Inputs to the analysis include project ID, location, projected energy savings, and cost. Output includes first-year dollar savings, discounted savings/investment ratio (SIR), and simple payback period. In order to qualify as an ECIP project, the SIR must be greater than one and payback must be less than ten years. The LCCID software used is version 1.062 (October 1991).

4.1 ECOs investigated for energy savings potential.

ECOs evaluated are presented in Table 3. Other ECOs discovered by the contractor during the site visit were also investigated. ECOs were evaluated for feasibility and energy savings potential. The analysis includes a system description, justification for rejection for ECOs not recommended, and estimated investment cost and estimated annual energy savings for recommended ECOs.

Table 3. Energy Conservation Opportunities Evaluated

Aspect	Item	Recommended	Rejected
Structural	Change roof color		x
	Dock Enclosure	x	
	Additional insulation under floors		x
	Additional panel insulation		x
	Insulation between compartments and roof	x	
	Plastic strip curtains inside refrigerated doors	x	
Maintenance and Repair	Replace Seals on refrigeration compartment doors	x	
	Repair refrigeration compartment doors	x	
	Distribution piping insulation	x	
	Repair or replace leaking ceilings	x	
	Repair or replace failed compartment panels	x	
	Clean refrigerant coils regularly	x	
Mechanical	Heat reclaim from compressors	x	
	Replace HVAC system/boiler	x	
	Evaporator size and location	x	
	High efficiency motors	x	
	Replace water heaters	x	
	Water heater controls		x
	Refrigerants		x
	Equipment location		x
	Modernized control system	x	
Lighting	Occupancy sensors for incandescent lights		x
	Replace incandescent lights with fluorescent	x	
	Replace incandescent lights with Metal Halide		x

Table 3, Continued

Aspect	Item	Recommended	Rejected
	Replace incandescent lights with High Pressure Sodium		x
Electrical Demand	Peak-shaving generators		x
	Improve power factor		
Operational	Reorganize food storage	x	
	Place North Freezer on Standby Status	x	
	Place Oleo Room on Standby Status	x	
	Remove New South Freezer	x	
	Relocate forklift storage and charging activities	x	
	Revamp customer service at the Mini-Mart	x	
	Remove Free-standing Freezer in Mini-Mart	x	
	Convert Mini-Mart Egg Room and Produce Room to Freezer	x	
	Remove unused equipment in Mini-Mart	x	
	Remove unused/obsolete equipment in Boiler Room	x	
	Remove unused/obsolete equipment in Mechanical Room	x	
	Remove meat hangers	x	
	Relocate cold storage office	x	
	Prepare Operating, Health, Safety Training Manual	x	
	Reroute traffic pattern now through Egg Room	x	

4.2 Recommended Energy Conservation Opportunities

This section discusses concepts, changes required, costs, and economic analysis for energy conservation opportunities (ECOs) recommended for implementation. Recommended ECOs are prioritized by Savings to Investment Ratio (SIR) rather than by investment cost or direct energy savings. Figures given are estimates based on manufacturers literature and experience, and it

is strongly recommended that metering of CSF energy consumption be initiated before, during, and after ECOs are implemented.

4.2.1. Water Heater Replacement

Currently, three gas water heaters provide CSF hot water needs. All of the units are old: two were produced by Jackson Manufacturing, which has been out of business for some years, and the third has no nameplate remaining. Two heaters are in the boiler room and one is in the mechanical room. Estimated energy consumption for the three units is approximately $500 per year (158 MBTU/yr).

In office occupancy, each person uses an average of one-half gallon of hot water per day. Due to the nature of the work and the VET office, CSF staff usage is higher, perhaps two gallons per person per day. This estimated 20 gallons per day hot water demand is divided among three latrines and the VET office.

The recommended replacement is four instantaneous electric water heaters. This demand-type system uses electricity only when the tap is turned on. Because water is heated only as it is used, the instantaneous water heater is much more efficient that bulk water heaters. The units can be installed under the sinks in the latrines and the VET office. A typical unit is illustrated in Figure 5. With an estimated investment cost of $1,165, annual energy savings are projected to be $148 per year (133 MBTU/yr). Payback is approximately 8 years, and the SIR is approximately 3.3.

4.2.2. Fluorescent Lighting Retrofit and Upgrade

The majority of the lights at the CSF are incandescent (100 watt bulbs). Considerable energy savings potential exists to retrofit the CSF with a more energy efficient lighting system. Other benefits to upgrading the lighting system include better lighting levels and a more sanitary and safe lighting system. Present lighting does not comply with new OSHA requirements.

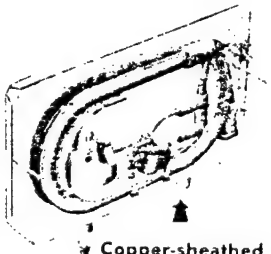
The recommended replacement lighting system uses fluorescent lamps in vapor-resistant fixtures.

Representative types of fixtures and lamps are presented in Figures 6 and 7. These fixtures are recommended for kitchens and food processing plants, and are UL listed for damp locations. Cold weather ballasts suitable for -20F temperatures are available. Guidelines from the Illuminating Engineering Society were used to evaluate the number of fixtures needed in CSF rooms, resulting in an overall lighting upgrade (more lumens) as well as energy savings. The total wattage using fluorescent lamps is estimated to decrease by 36 percent while average lumens per room increases 134 percent. In addition, fluorescent lamps have average life spans of 12,000 hours, compared to 750 hours for incandescent. Due to the improvement in lighting level, however, there is a net annual increase in lamp replacement cost.

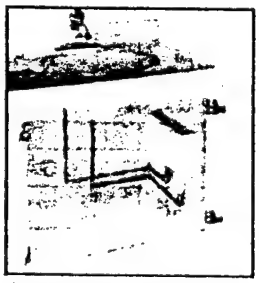
The fluorescent luminaries can be installed on the junction boxes of the incandescent luminaries, so rewiring is unnecessary. The fluorescent luminaries are estimated to cost about $ 26,200 installed. Note that each watt of electricity saved in the lighting system also saves an additional one-half watt in refrigeration load. Annual electricity savings are estimated at $5,520 (425 MBTU/yr), a 41 percent decrease. Payback for this investment is approximately 5.3 years, and the SIR is 2.1.

Figure 5
Instantaneous Water Heaters

POWERSTREAM INSTANTANEOUS ELECTRIC WATER HEATERS



Copper-sheathed heating element heats water as it flows through the Powerstream. No tank to limit volume.



Installs close to faucet or tap to eliminate long pipe runs

TECHNICAL DATA

Stock No.	Powerstream Model	Wire Size	Voltage	Amps	High kW	Low kW	Temp. Rise @ Flow Rate* 0.5 GPM	0.75 GPM	1 GPM	1.5 GPM	2.0 GPM
4E186	RP1	8 GA	240	40	9.5	–	—	84	64	42	32
4E186	RP1	8 GA	240	20	—	4.75	64	42	32	21	16
4E186	RP1	8 GA	208	35	7.1	—	—	64	48	32	24
4E186	RP1	8 GA	208	18	—	3.5	48	32	24	16	12
4P001	RP2	10 GA	277	22	6	—	—	56	40	30	20
4P001	RP2	10 GA	277	11	—	3	41	28	20	—	—
4P002	RP3	10 GA	110	28	3	—	41	28	20	—	—

(*) °F at GPM. Gallons per minute minimum water pressure 15 PSI maximum water pressure 150 PSI. Specifications subject to change without notice.

Complies with National Appliance Energy Conservation Act effective January 1, 1990.

Powerstream is used in applications where a low-flow, continuous supply of hot water is needed: homes, offices, warehouses, service stations, and stores.

Demand-type system uses electricity only when tap is turned on. Because water is heated only as it is used, Powerstream is much more efficient than conventional water heating methods.

High Low heat settings allow user to select degree of heating required

Mounts in any direction. Space saving design mounts flush to wall or cabinet. 3/8" NPT inlet and outlet. In line flow controls and faucet aerators should be used with all models for optimum performance.

Features include solid copper heat exchanger, lead free construction, dual heat settings, and durable plastic housing. Measures just 12¼L. x 3W x 6½"H. UL Listed. Powerstream brand.

No. 4P001. 277 Volt model is designed for facilities (factories, office buildings, warehouses) that have 440 volt service.

No. 4P002 is recommended where ground water temperatures exceed 60°F and flow rates are less than 1 GPM.

ORDERING DATA

Stock No.	Mfr. Model	List	Each	Shpg. Wt.
4E186	RP1	$239.00	**$207.83**	5.8
4P001	RP2	239.00	**207.83**	5.8
4P002	RP3	239.00	**207.83**	5.8

SEE WARRANTY INFORMATION ON PAGE OPPOSITE INSIDE BACK COVER

Source: WW Graingers

4.2.3. Add Insulation Above Refrigeration Units

There is an existing layer of batting on top of the refrigeration units and a dead air space between the insulation and the underside of the roof. Adding additional insulation will reduce heat gain from solar irradiation on the roof, and from outside higher temperatures. Three options to add insulation include:

- Spray insulation on the underside of the roof
- Suspend a layer of insulation between the roof and the ceilings
- Lay more batting on top of existing insulation

The third option is recommended because of its lower cost compared with small differences in energy savings. The estimated investment is $ 16,725. Projected energy savings are $2,0126 per year (145 MBTU/yr). Payback is estimated at 8.3 years, with a SIR of 1.7.

Before this upgrade can be made, it will be necessary to replace or repair leaking ceilings, and any damaged insulation above (see section 4.3).

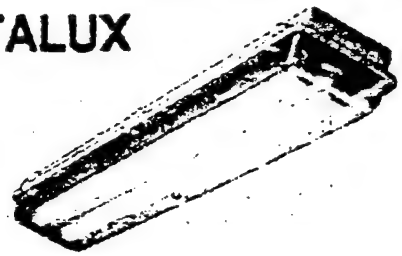
4.2.4. Upgrade Main Meat Freezer Evaporators

The main meat freezer room is presently served by two Krack BL42512 vertical floor mounted evaporators with water defrost connected to the central low temperature system. This defrost

Figure 6

DUST/VAPOR RESISTANT FLUORESCENT FIXTURES

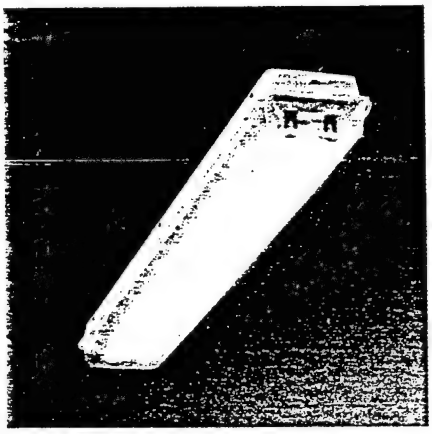
METALUX



Applications: Use in kitchens, food processing plants or where sanitation is important.
Housing: Noncorrosive fiberglass body for indoor use only. Completely sealed, fully gasketed to resist dust and moisture.
Ballast: 120V, 60 Hz, UL Listed as suitable for damp locations; IBEW Label.
Lens: Clear acrylic diffuser.
Installation: No. 4V378 for suspension mounting only.
Lamp not included: For better lighting results use energy-saving, high color rendering lamps such as Advantage X, Specline, or Ultralume lamps from Philips. See fluorescent lamps listed on pages 700-707.

FLUORESCENT FIXTURES SPECIFICATIONS AND ORDERING DATA

Lamps Required (Not Included) Qty.	Watts	Type	Ambient Temp °F Min	Max	Line Amps	Dimen., In. L	W	H	Metalux Model	Stock No.	Less Lamps List	Less Lamps Each	Shpg. Wt.
2	40	F40	50	122	0.73	52	8	4 5/8	VT240DRDL120VLE3	**3V441**	$90.83	**$77.20**	14.0
2	75	F96T12	50	122	1.35	100	8	4 5/8	VT296DRDL120VLE3	**4V379**	160.72	**136.63**	38.0
→ 2	110	F96T12HO	−20	122	2.05	100	8	4 5/8	VT296HODRDL120LE3-20*	**4V378**	233.40	**198.39**	38.0



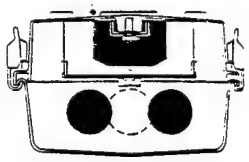
VT Industrial/Vaportite

- Equipped with Energy Saving Ballasts/Complies with Federal Energy Efficiency Standards(E)
- Reinforced Fiberglass Housing/ Waterproof and Chemical Resistant
- Low Brightness Acryiic or Polycarbonate Lens
- Completely Gasketed/Suitable For Damp Locations
- UL Listed/Optional Wet Location Listing Available
- Heavy Duty Cam Latching
- Baked White Enamel Finish Liner/ High Reflectance
- Vandal Resistant Feature Available
- Also Available in Tandem 8' Lengths

METALUX

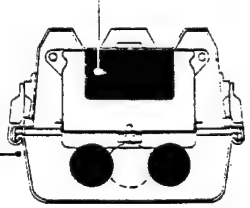
Design Features

Construction
Fiberglass is reinforced polyester and self-extinguishing (ASTM D635-74) plastic of a permanent pearl gray color. Top of housing has eleven embossments, (4' units), 22 embossments (8' units), providing a range of mounting locations. A 7/8" hole is normally provided at each end of housing for conduit entry for continuous fed. PVC plugs and nuts are provided for sealing holes. Closed cell neoprene gasketing is bonded to the housing to form continuous seal for the diffuser. Six cam latches (4' unit), 12 cam latches (8' unit) clamp diffuser tightly to housing.



4' or 8' - 1 or 2 Lamp RS

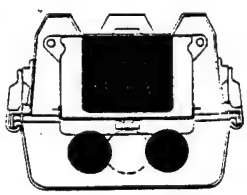
Electrical
Unit has internal full metal liner for positive grounding and maximum protection and rigidity. Ballast, Class P CBM/ ETL certified suitable to plus 50°F. (Cold temperature ballasts are available suitable to 0°F. on special order.) Pressure lock lampholders. UL listed and IBEW labeled. System Input Watts: (Energy Saving Ballast and Energy Saving Lamps) (Energy Saving Ballast and Standard Lamps) (Standard Ballast and Standard Lamps) 140 (42) (47) (54), 240 (72) (82) (92), 148 (N/A) (N/A) (59), 196 (N/A) (N/A) (96), 248 (N/A) (N/A) (94), 296 (120) (152) (166), 148HO (N/A) (N/A) (82), 248HO (N/A) (N/A) (138), 196HO (N/A) (N/A) (137), 296HO (203) (233) (250).



4' or 8' - 1 or 2 Lamp SL

Shielding
"DR" - Clear low brightness pattern acrylic with high impact additive. 15%
"DR-100" - Clear low brightness pattern acrylic with high impact additive. 100%.
"LEX" - High impact clear low brightness pattern polycarbonate. LEXAN

Catalog Number	Lamps	Ballast	Nominal Size (ft.)	Wt.	Dimensions (in.) Length	Width	Height	Channel Diagram*
VT-140 DR	1F40	Rapid Start	4	15	52	8	4-5/8	17
8TVT-140 DR	1F40	Rapid Start	8	30	102	7-7/8	5-5/8	17
VT-240 DR	2F40	Rapid Start	4	15	52	8	4-5/8	17
8TVT-240 DR	2F40	Rapid Start	8	30	102	7-7/8	5-5/8	17
VT-148 DR'	1F48	Slimline	4	15	52	7-7/8	4-5/8	17
VT-196 DR'	1F96	Slimline	8	34	102	7-7/8	5-5/8	17
VT-248 DR'	2F48	Slimline	4	15	52	7-7/8	4-5/8	17
VT-296 DR	2F96	Slimline	8	34	102	7-7/8	5-5/8	17
VT-148HO DR'	1F48	800MA	4	19	52	7-7/8	5-5/8	17
VT-248HO DR'	1F48	800MA	4	19	52	7-7/8	5-5/8	17
VT-196HO DR'	1F96	800MA	8	35	102	7-7/8	5-5/8	17
VT-296HO DR	2F96	800MA	8	35	102	7-7/8	5-5/8	17

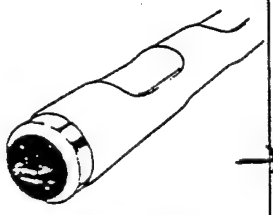


4' or 8' - 1 or 2 Lamp HO

Figure 7

Fluorescent Lamps

WATT ES	WATT NON-ES	NATIONAL STOCK NUMBER	LUMENS	BASE	COLOR/SPECIAL FEATURES	MAX. OVERALL LENGTH	ESTIMATED AVG. LIFE
HIGH OUTPUT 800ma T-12 RAPID START LAMPS							
55	60	6240-01-344-9517	3850	REC. D.C.	3000K, 800ma	48	12000
55	60	6240-01-344-9518	3850	REC. D.C.	3500K, 800ma	48	12000
55	60	6240-01-344-9519	3850	REC. D.C.	4100K, 800ma	48	12000
55	—	6240-01-344-9520	3900	REC. D.C.	LITE WHITE, 800ma	48	12000
95	110	6240-01-344-9526	8500	REC. D.C.	3000K, 800ma	96	12000
95	110	6240-01-344-9527	8500	REC. D.C.	3500K, 800ma	96	12000
95	110	6240-01-344-9528	8800	REC. D.C.	3000K, 800ma	96	12000
95	110	6240-01-344-9529	8800	REC. D.C.	3500K, 800ma	96	12000
95	110	6240-01-344-9530	8800	REC. D.C.	4100K, 800ma	96	12000
95	110	6240-01-073-4487	8000	REC. D.C.	COOL WHITE, 800ma	96	12000
95	110	6240-01-344-9539	8275	REC. D.C.	WARM WHITE, 800ma	96	12000
95	110	6240-01-344-9957	5800	REC. D.C.	DELUXE WARM WHITE, 800ma	96	12000
95	110	6240-01-345-2253	8375	REC. D.C.	WHITE, 800ma	96	12000
95	110	6240-01-344-9540	5800	REC. D.C.	DELUXE COOL WHITE, 800ma	96	12000
95	—	6240-01-344-9538	8675	REC. D.C.	LITE WHITE, 800ma	96	12000
95	110	6240-01-344-9522	6750	REC. D.C.	DAYLIGHT, 800ma	96	12000
95	110	6240-01-344-9521	8600	REC. D.C.	4100K, 800ma	96	12000



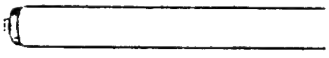
Recessed Double Contact

PHILIPS HIGH OUTPUT AND VERY HIGH OUTPUT FLUORESCENT LAMPS

High Output (HO) fluorescent lamps are designed to work with and 800ma ballast. HO lamps are available in a series of color choices. See SPEC and Ultralume listings on nearby page for colors not listed below.

Very High Output (VHO) fluorescent lamps operate at 1.5 amperes (1500ma) for the highest lumen output per length of any flourescent lamp. Philips 1500ma lamps are made in several types, each designed for maximum light output under specific operating conditions. VHO type are for indoor applications, VHO-O jacketed type are for very cold-subzero applications.

PHILIPS



ENERGY SAVER

T-12 Recessed Double Contact Base

For a more complete listing of HO, VHO and VHO-O lamps see pages 741 and 742.

Watts	Ordering Code	NAED Number	Description	Bulb	Base	Rated Avg Life (Hrs)	Approx Initial Lumens	Nominal Length	Kelvin Color Temp	Color Rend Index	Stock No.	List	Each	Case Each	Lamps Per Ship Case	Shpg. Wt.
(HO) HIGH OUTPUT FLUORESCENT LAMPS																
35	F24T12/CW/HO	262790	Cool White	T12	RDC	9000	1700	24	4100	67	**4V528**	$12.05	**$10.85**	**$10.30**	24	0.4
40	F30T12/CW/HO	226464	Cool White	T12	RDC	9000	2290	30	4100	67	**4V480**	14.35	**12.92**	**12.27**	24	0.5
50	F36T12/CW/HO	262865	Cool White	T12	RDC	9000	2900	36	4100	67	**4V529**	12.79	**11.51**	**10.94**	24	0.6
55	F42T12/CW/HO	263046	Cool White	T12	RDC	9000	3500	42	4100	67	**4V530**	13.52	**12.17**	**11.56**	24	0.6
60	F48T12/CW/HO	222422	Cool White	T12	RDC	12000	4300	48	4100	67	**3V443**	8.96	**8.06**	**7.66**	30	0.7
75	F60T12/CW/HO	222851	Cool White	T12	RDC	12000	5400	60	4100	67	**4V476**	9.96	**8.96**	**8.52**	30	0.9
85	F72T12/D/HO	212001	Daylight	T12	RDC	12000	5600	72	6500	79	**4V444**	12.14	**10.93**	**10.38**	15	1.2
85	F72T12/CW/HO	211995	Cool White	T12	RDC	12000	6650	72	4100	67	**3V438**	9.21	**8.29**	**7.87**	15	1.2
95	F84T12/CW/HO	212050	Cool White	T12	RDC	12000	7800	84	4100	67	**4V445**	9.88	**8.89**	**8.45**	15	1.4
95	F84T12/D/HO	212068	Daylight	T12	RDC	12000	6900	84	6500	79	**4V446**	12.33	**11.10**	**10.54**	15	1.4
110	F96T12/WW/HO	342287	Warm White	T12	RDC	12000	9200	96	3000	53	**3V541**	11.04	**9.94**	**9.44**	15	1.5
110	F96T12/D/HO	342238	Daylight	T12	RDC	12000	7800	96	6500	79	**4V600**	9.71	**8.74**	**8.30**	15	1.5
110	F96T12/CW/HO	342204	Cool White	T12	RDC	12000	9200	96	4100	67	**3V181**	7.83	**6.26**	**5.95**	15	1.5
110	F96T12/C50/HO	342261	Colortone 50	T12	RDC	12000	6300	96	5000	92	**3V540**	13.98	**11.18**	**10.62**	15	1.5
ECON-O-WATT ENERGY-SAVING (HO) HIGH OUTPUT LAMPS																
95	F96T12/LW/HO/EW	342162	Lite White	T12	RDC	12000	9100	96	4100	51	✓**3V363**	9.96	**8.96**	**8.52**	15	1.5
95	F96T12/WW/HO/EW	342196	Warm White	T12	RDC	12000	8500	96	3000	53	✓**3V536**	11.68	**10.51**	**9.99**	15	1.5
→ **95**	F96T12/CW/HO/EW	342147	Cool White	T12	RDC	12000	8300	96	4100	67	✓**3V351**	9.21	**8.29**	**7.87**	15	1.5
(VHO) VERY HIGH OUTPUT LAMPS																
215	F96T12/WW/VHO	342428	Warm White	T12	RDC	12000	16000	96	3000	53	**4V602**	21.25	**19.13**	**18.17**	15	1.5
215	F96T12/CW/VHO	342345	Cool White	T12	RDC	12000	15500	96	4100	67	**3V256**	16.60	**14.94**	**14.19**	15	1.7
(VHO-O) VERY HIGH OUTPUT JACKETED LAMPS																
212	FJ96T12/CW/VHO-O	283978	Cool White	T12	RDC	12000	15500	96	4100	67	**4V543**	28.06	**25.25**	**23.99**	8	4.3
ECON-O-WATT ENERGY-SAVING (VHO) VERY HIGH OUTPUT LAMPS																
185	F96T12/CW/VHO/EW	342329	Cool White	T12	RDC	12000	14000	96	4100	67	✓**3V374**	17.10	**15.39**	**14.62**	15	1.5
185	F96T12/LW/VHO/EW	342337	Lite White	T12	RDC	12000	14900	96	4100	51	✓**4V601**	20.50	**18.45**	**17.53**	15	1.6

system, as well as the units themselves, have become obsolete in the industry. Defrosting requires the time and attention of a serviceman for about two half-days per week and uses copious quantities of water. The two existing units cannot feasibly be converted to other types of defrost, but they can be replaced with current versions of the same model with automated electric defrost.

Investment cost for two new units is estimated at $53,760. Energy savings due to decreased humidity and increased efficiency were estimated at $1,700 per year (122 MBTU/yr). An estimated additional $4,500 per year is saved in personnel costs for manual water defrost. This investment gives an estimated SIR of 1.5, and a payback of 8.6 years. Suitable replacement models are presented in Appendix 4.

4.2.5. Reseal and Repair Existing Doors and Install Plastic Curtains

These low-cost measures will reduce infiltration around the doors to refrigerated chambers. Existing seals are badly worn, leakage is extensive when doors are closed. In addition, doors are heavy and tend to not open easily (scrape the floor). The doors should be repaired and new seals installed. Materials cost for seals is about $ 620. Some refrigerators and freezers already have plastic strip curtains. Adding curtains to the remaining rooms (11 doors) is an inexpensive way to reduce infiltration when doors are opened. Estimated materials cost is $5,630.

This project could easily be a "self-help" project to minimize initial investment cost. With an investment of $6,970 an energy savings of $752 per year (54 MBTU/yr) could be realized. This represents a SIR of 1.5 and a payback of 9.3 years.

4.2.6. Upgrade Main Compressor Motors to High Efficiency Models

The 40 and 50 horsepower (hp) motors which drive the low and medium temperature systems, respectively, use a significant portion of total CSF electricity. These motors have nominal efficiencies of 90.2%. Motors are available with efficiencies of up to 94%. Estimated energy savings, motor replacement costs, and paybacks are summarized in Table 4. Assumptions include 20 hour/day operation for one compressor, with a shaft load of 80% of full load. If

only one compressor is actually required for each system, since the others are labeled "backup," then only one motor for each system could be purchased. The backups would continue to operate with their existing motors. Projected savings, however, could justify purchase of two high-efficiency motors for each system. Initial investment is $4349 for one motor per system, and $8697 for two motors per system. Payback times are about 5 years with the purchase of one motor per system (SIR > 2.5), and about 9.7 years (SIR = 1.41) for two motors per system. Energy savings would be the same.

Table 4. High Efficiency Motor Energy Saving Opportunities

Motor	Investment Cost ($)	Energy Savings		Payback (yrs)	SIR
		(MBTU/yr)	($/yr)		
One 50 HP	$2,342	34	475	4.9	2.8
Two 50 HP	$4,683	34	475	9.9	1.4
One 40 HP	$2,007	27	380	5.3	2.6
Two 40 HP	$4,014	27	380	10.6	1.3
Combined	$8,697	64	897	9.7	1.4

4.2.7. Dock Enclosure, HVAC, and Operational Modifications

This ECO combines several measures to upgrade the facility and conserve energy. The individual changes comprising this ECO and the rationale for making them are listed in Table 5. Energy savings is only one of the justifications for making changes. As energy saving opportunities are explored, operational improvements, facility upgrades, and investment recouping were also investigated. By combining the items in Table 5, the ECO has an estimated

savings to investment ratio greater than one. Together, the package has an estimated investment of $142,311 and annual energy savings of $9,151 (742 MBTU/yr). An estimated initial salvage value of $58,000 helps to make this ECO feasible. Payback is estimated at 11.7 years, with an SIR of 1.3. Individual components of this package are discussed below.

Table 5. Dock Enclosure, HVAC, and Operational Modifications

ECO Component	Justification			
	Energy Savings	Operational Improvements	Facility Upgrade	Recoup Salvage Value
Enclose West Dock	x	xx	xx	
Enclose Part of East Dock	x	xx	xx	
Remove Boiler, Replace with two HVAC Systems Supplemented by Heat Reclaim from Refrigeration	x	x	xx	x
Repair Roll-Down Doors on Passageway	x	x		
Move Forklifts to East Dock Enclosure	x	xx	xx	
Dismantle and Sell South Freezer				x
Place North Freezer on Standby	x	x		
Place Oleo Room on Standby	x	x		
Remove Free-Standing Freezer in Mini-Mart	x	xx		x
Reconnect Mini-Mart Egg and Produce Rooms to Low Temperature System	x	xx	x	
Refrigerate Mini-Mart		xx	x	

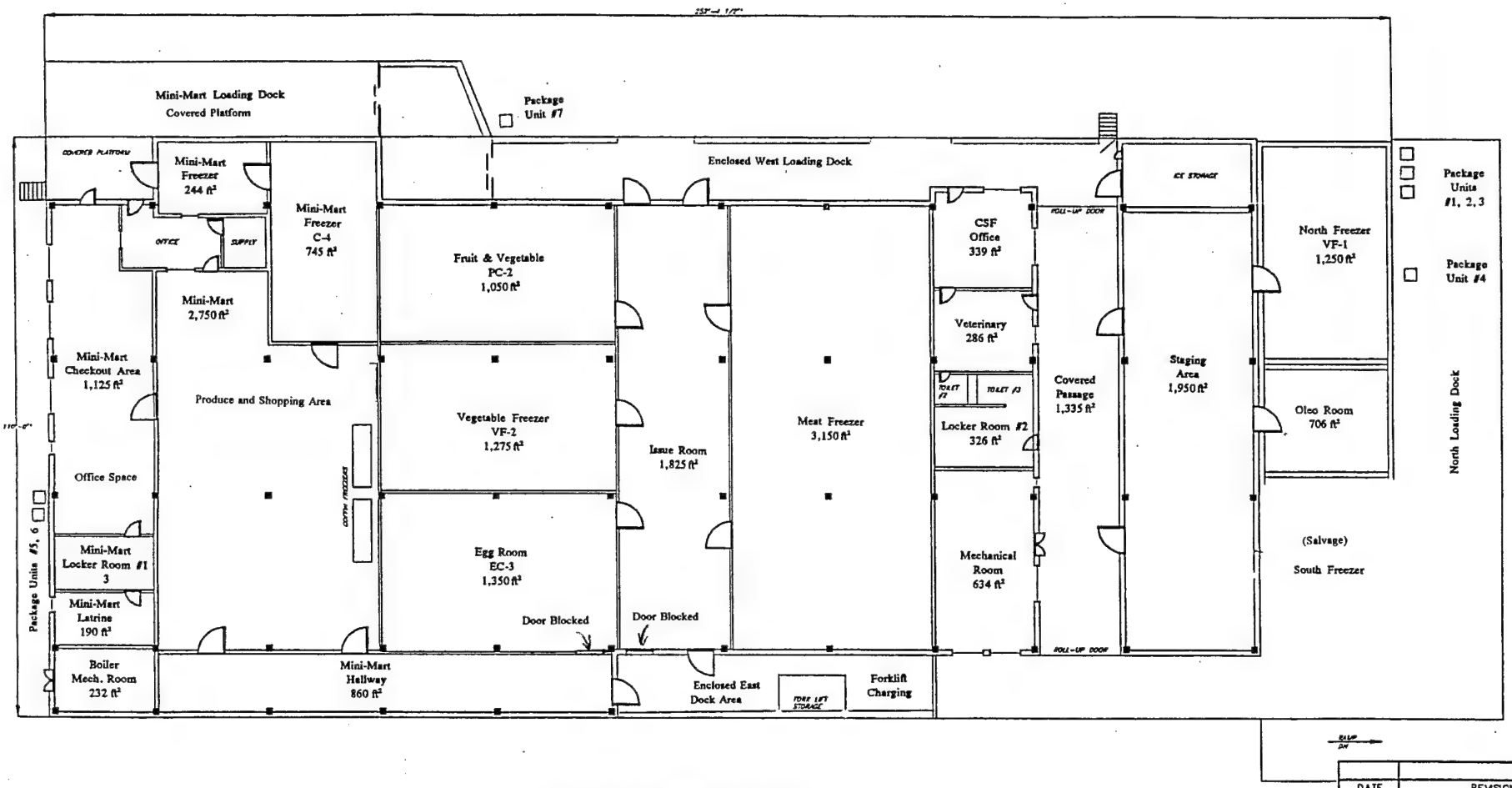
Dock enclosure. Enclosing the west dock and part of the east dock improves energy and operational efficiency. The dock enclosure concept is shown in Figure 8. The west dock from the Ice Storage area to the Vegetable Cooler (PC-2) would be enclosed and used for delivery only, and involves the following changes:

- Insulated enclosure
- Insulated overhang roof
- Two unloading ports with rubber seals and doors
- Personnel exit door at steps near ice cooler
- Access door at south end of enclosure for employees only, with motion- activated sliding door (lockable)
- Overhead lighting (possible modifications needed)

An airlock chamber completes the south end of the west dock enclosure. This chamber is formed by continuing the west dock enclosure to the wall of the Mini-Mart area and involves the following changes:

- Insulated enclosure
- Insulated overhang roof
- Access door facing west, with motion-activated sliding doors (lockable)
- Relocation of vegetable freezer condensing unit
- Overhead lighting (possible modifications needed)

An overhang on the west dock from the vegetable cooler to the Mini-Mart entrance provides protection from the sun to the west wall of the Mini-Mart refrigerated storage area. Side benefits include weather protection for pickups. This dock area would be for pickups only.



Note: Add Plastic Curtains to Refrigerated Room Doorways
Repair Existing Doors for Free Swing Opening
Replace Seals on Existing Doors

NORTH

GRAPHIC SCALE
20' 0 20' 40'

DATE	REVISIONS	BY

ENERGY STUDY
FORT CAMPBELL COLD STORAGE
Fort Campbell, Kentucky

SCALE: 1" = 20' | DR: Jone | CH: WJR | KT: BW

PREPARED FOR: CORPS OF ENGINEERS
LOUISVILLE DIVISION

PREPARED BY:
OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PROJ: 042670070002 DATE: 11-19-92 SHEET 1 OF 1

Figure 8. Cold Storage Facility Proposed Changes

Repair or replacement of the roll-down door at the east end of the breezeway closes the breezeway (in conjunction with the west dock enclosure) and provides more dead-air space insulation. The following changes are involved:

- Repair or replace roll down metal door at east end of breezeway (lockable)
- Provide additional ventilation to mechanical room to outside if needed

Enclosing the east dock from the Mini-Mart hallway to the end of the large meat freezer provides protection for the east side of the meat freezer by adding a dead air space between it and the outside. Other benefits include a new area for forklift storage (adjacent to meat freezer) and revised traffic pattern to eliminate the pathway through the Egg Room. Changes involved in this dock enclosure include:

- Insulated wall
- Insulated overhang roof
- Add electrical panel to provide for forklift charging
- Ventilate forklift storage as required
- Unblock one east door (1 of 2) of Issue Room and replace existing door with pressure plate sliding doors
- Unblock north door (1) of Mini-Mart hallway and replace existing door with pressure plate sliding door
- Block east door to Egg Room and seal to minimize infiltration
- Overhead lighting (modification may be required)

Rerouting traffic to allow blockage of the east door in the Egg Room (Figure 8) will improve both energy and operational efficiency. The room presently has two doors, often left open, and refrigeration losses from the cross ventilation. Traffic would instead pass between the Mini-Mart hallway and the issue room via the dock enclosure (with pressure plate sliding doors) providing an airlock between them. The door could be simply blocked and sealed for minimal cost, or removed and the opening bricked up for about $335.

Revise or Repair Building HVAC Controls. The original steam heating system is no longer used for meat processing, so the boiler is very oversized for space heating. Steam is fairly inefficient, and an oversized system is even more so. Abandonment of the steam system and installation of a rooftop heating and cooling unit with overhead ductwork should result in

considerable energy savings and increased comfort.

The boiler has a capacity of about 1,000,00 BTU/hr. Originally the boiler served a meat-processing facility and heated about 8,000 square feet. It is estimated that the space heating requirement was about 300,000 BTU/hr and the remainder was for the meat-processing. Now that the boiler serves only as a heater, the standby and other losses continue but the boiler is very oversized. Under these circumstances, the boiler operates at an efficiency of about 40%. If the boiler were replaced with a modern, induced-draft gas furnace or rooftop heating coil unit, the efficiency could be greatly improved - to about 75-80%.

If the boiler operates at about $3000 per year, a gas furnace or rooftop unit could warm the same space for about $1560 per year. Cooling could be provided by the same system for improved warm weather comfort. In addition, cooling and dehumidification of the interior spaces near the freezers and coolers would reduce heat gains from hot adjacent spaces and from infiltration.

The existing approximately 2,555 square foot checkout and office spaces will require about eight tons of air conditioning at a cost of $1,500 per ton, or $12,800. A second area to condition includes the CSF office, VET office, Staging Area, Issue Room, Covered Passage, and enclosed docks. If this area of about 11,300 square feet is conditioned, then the total cooling system (comprised of two units) would have a capacity of about 45 tons and would cost about $68,000. Figure 8 reflects the expanded conditioned areas. Note that the more efficient lighting recommended in Section 4.2.2 would reduce both the initial and operating costs for cooling.

Heat Reclaim from Hot Refrigerant Gas. Both the medium and low temperature systems have a large supply of heat to be rejected. Heat recovery from desuperheating the hot gas provides a simple way to salvage and use part of this heat. Desuperheaters could be used to heat domestic water or space heating. Since water use is low, the more efficient use is for space heating. Approximately 50,000 BTU/hr each are available from desuperheating the central low temperature and medium temperature systems.

Space heating will use larger quantities of heat than water heating, but only for part of the year. Refrigerant heat reclaim coils are commonly used in supermarket systems. Two reclaim coils, one for each system, can be installed in the duct system serving the office, passage, and enclosed dock areas adjacent to the equipment room. The cost of these coils, controls and piping is estimated at $2,000, and the annual savings in natural gas heat would be about 158 MBTU, or $500. Payback is estimated at 4.5 years.

Remove old, unused equipment. A partial list of unused equipment that should be removed and salvaged to allow more efficient use of space:

- Unused water heaters (note: there are two water heaters in the mechanical room, one in the boiler room. None appeared to be in use during the visit. All are gas-fired, all are old. These three could probably be replaced with two small new efficient heaters.) Assume no salvage value.

- Meat hanging and transport system in the checkout area, Mini-Mart hallway, issue room and egg room. These steel trolley racks help to transfer heat between rooms and to the outside. Salvage value is estimated at between $2,000 and $5,000.

- Butchering and rendering equipment in the Mini-Mart checkout area. This space could be more efficiently used for managing operations. Assume no salvage value.

- The old, oversized air handling units in the Mini-Mart area should be removed and replaced with the central HVAC system described in this section.

Relocate forklift storage and charging. As mentioned in Section 4.2.1, the enclosure of the east dock from the Mini-Mart hallway to the end of the meat freezer could provide a convenient yet safe place for the forklifts.

Reorganize Food Storage. The Cold Storage Facility is presently not used to capacity. More efficient organization and higher loading in some refrigerators and freezers could allow others to be turned off and maintained in back-up status.

The new, inoperable freezer is not needed at present operating levels. Information received from Ft. Campbell personnel indicate that present levels are representative of future levels. We

recommend either using the compartment for storage of irradiated milk or dismantling and selling it. Salvage value could be $25,000.

Food items now in the North Freezer (VF1) can be consolidated into the Meat Freezer (MF), the Vegetable Freezer (VF2), and the proposed Mini-Mart Freezer. Savings are estimated to be 264 MBTU/year, or $3,684. Similarly, the Oleo Room could be shut down and food items consolidated into the Produce Room (PC-2), the Egg Room (EC-3), and the Mini-Mart. Savings in shutting down the Oleo Room are estimated at 118 MBTU/year, or $1,646. These units could be maintained in standby status to be activated if needed.

Revamp Refrigeration Systems in the Mini-Mart. The free-standing freezer in the Mini-Mart, while only a few years old, has not performed to expectations. Leaks, broken door closers, and general inconvenience are some of the complaints. This unit could be dismantled and sold for an approximate salvage value of $35,000. To compensate for this loss of freezer space, as well as the shutdown of the north freezer, the present Mini-Mart Egg and Produce Rooms could be reconnected to the central low temperature system. The Produce Room was initially designed as a freezer according to original drawings. The cost to reconnect these two room is about $4,000.

Finally, the Mini-Market itself can be converted to a medium temperature (50 F) room so that products can be stacked directly on the floor or shelves for selection by customers. The existing air handling units must be removed and new refrigeration-type evaporators installed. Low-air type units are recommended to minimize customer discomfort. These units will be installed overhead. Two units are recommended to provide even distribution, each with a capacity of about 24,000 BTU/hr with Fans, drain pans, and enclosures. The evaporator could be connected to the existing medium temperature R-22 system. The system has adequate capacity to include this area, especially with projected energy savings. Controls would be local thermostats, and the central system would continue to operate as presently. The budget cost for evaporators, installed, is about $8,750.

4.2.8. Facility Control System.

Direct digital control systems are available to perform a multitude of functions. These systems can optimize refrigeration system performance, initiate defrost, turn off lights, water heaters and air conditioning after hours, monitor transformer loading, sound alarms, log trends, etc. Several of these functions can be done in no other way. Such a system for the CSF would consist of 116 total computer points (34 analog input points and 82 binary output points). The system would include a personal computer, software, and control system hardware. A budget figure for the basic package is $47,400. Wiring is estimated to cost another 10%, or 4,740, for a construction cost of about $ 52,140. The total estimated initial investment cost of $58,400 is predicted to save about eight percent of CSF electrical energy annually (289 MBTU/yr) plus additional savings if lights are switched off by the system (100 MBTU/yr). These two energy savings total approximately $5,000 per year. Other probable non-energy savings are in service/monitoring time (save 1/2 day per week, or about $2,200 per year), and in fewer breakdowns of equipment (save about $1,000/year). When combined, energy and non-energy savings result in an estimated annual savings of $8,707 (389 MBTU/yr), a payback period of 6.7 years, and a SIR of 1.2.

4.3 Maintenance and Repair Recommendations

Repair Leaking Ceilings. Several cold storage units have leaking ceilings, apparently caused by condensation in the unit. These rooms need to be analyzed to eliminate or minimize sources of condensation. Ceilings need to be repaired and damaged insulation replaced, especially before new insulation is installed as recommended in 4.2.3.

- Vegetable Cooler PC-2
- Main Meat Freezer - one problem is the water defrost - see 4.2.4.
- Mini-Mart Hallway
- Crushed Ice Storage

Repair Refrigeration Compartment Doors and Reseal. See 4.2.5.

Repair Refrigeration Compartment Panels. Panels should be periodically checked for signs of failed insulation. Panels should be repaired or replaced as needed.

Refrigerant Cooling Methods. The system presently has evaporative condensers, which are more efficient than air-cooled condensers according to Army Design Manual 3.4. Proper maintenance has a major effect on the performance of these condensers. We recommend a complete cleaning of the coils, sumps and spray nozzles and a thorough checkout of the head pressure control and freeze protection systems.

Evaporator Size and Location. Table 6 presents an initial list of evaporator units that are scheduled to be replaced under a different maintenance project at Fort Campbell. While some energy savings can be realized by replacing these units, the major benefit is the savings in repair time and unexpected downtime. It is recommended that these units be replaced. Note that the Main Meat Freezer evaporators are included as an ECO in Section 4.2.4 with significant savings due to the elimination of water defrost.

Table 6. Evaporator Units Scheduled for Replacement

ROOM	UNIT	Design Temp (F)	Refrigerant
Meat Freezer	Krack (2 units)	0 to -10	R502
Vegetable Cooler (PC2)	Krack CP 1326-6 (2 units)	35-40	R22
Egg Room (EC3)	Krack BUC2700 ED	30-35	R22
Issue Room	Krack CP 1326-6 (2 units)	-	R22
Mini-Mart Produce (C4)	Krack SS-244-170 -EDL-DXF (2 units)	-	R22
Mini-Mart Egg Room	Krack BUC 950 (1 unit)	-	R22

Distribution Piping Insulation. Regular inspection and repair as needed is recommended.

4.4 Operational or Policy Change Recommendations

Changes recommended include a computerized inventory system, staff filling orders instead of customers, space organization, and development of an operating, health, and safety manual. An additional staff person may be required on pickup days.

A checklist of available items could be computerized and provided to customers either in advance or upon arrival. These customers would then complete the checklist as to what they wanted and give it to Cold Storage personnel for assembly. If the completed shopping list were FAXed into the Cold Storage Facility in advance of arrival, the order could be prepared and ready for pickup at a given time. Customers would have access to the Mini-Mart office area only. At present, customers tend to leave the Mini-Mart and look for items in the main (storage) areas. The customer would enter the checkout area, present a completed checklist, and wait for it to be filled. A computerized inventory software program for a personal computer should cost less than $5,000.

The Mini-Mart (proposed to be kept at 50 F in Section 4.2.7) could be organized and used as a staging area for prepared orders, or stocked in advance on pickup days to provide quick filling of customer orders. The free-standing unit can be sold for an estimated salvage value of $35,000 (see Section 4.2.7).

Storage/staging of items in the Mini-Mart hallway, the Mini-Mart, and the Mini-Mart west refrigerated storage area should be organized, labeled, and maintained. There is a lot of room to stock items in preparation for heavy customer pickup days, especially if unused equipment is removed.

In conjunction with the Mini-Mart operational changes, a manual is recommended to provide operation practices, safety and health requirements, and training of staff. This is especially important since military personnel now serve six-month tours at the CSF. Organization, efficiency, and safety are keys to energy savings through operational changes. Development and

implementation of a manual is estimated at $20,000 if prepared under contract. If this manual is prepared by Ft. Campbell personnel, costs would be much lower.

With the enclosure of the west dock, the existing cold storage office would no longer have a view of incoming and outgoing traffic. The cold storage office operations could be moved to the Mini-Mart area, preferably in the small unused office by the outside entrance. The majority of space in the existing office is used as a break room, and could continue to be used as such.

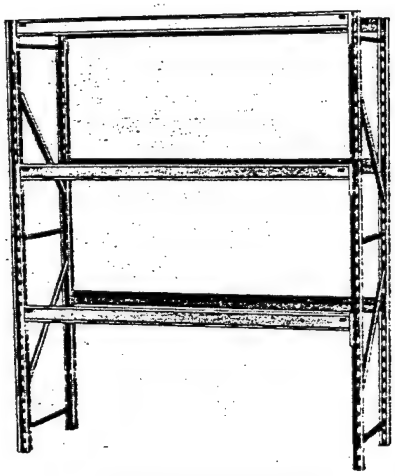
Shelving units can be installed as appropriate to allow food to be stacked two pallets high. Appropriate shelving is illustrated in Figure 9.

Figure 9.

STORAGE EQUIPMENT

PALLET STORAGE RACKS

Designed to store palletized and heavy bulk loads handled by mechanical equipment



Rack Shown Consists of Two Frames and Six Beams

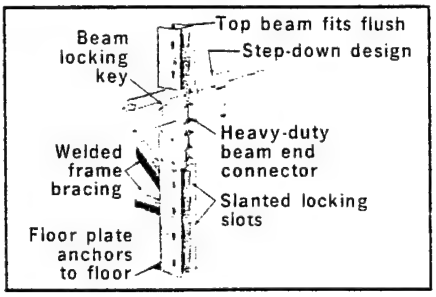
PENCO

Questions? See Selection Guide on Page 1518.

Accessories are Available See Following Page for Listing

FREIGHT PREPAID ON ORDERS OF $900 OR MORE

See Freight Policy On Page Opposite Inside Back Cover



- **Frames available in 18,000-lb and 24,000-lb capacity**
- **Completely prefabricated upright frames with 14-gauge posts, welded braces and foot plates**
- **Beams are 14-gauge steel, roll formed in one piece with overlapping seam**
- **Beam end connector is 3 x 8½" oversize reinforced 3-prong connection to give tight fit and increase lateral stability**
- **Frames are gray enamel finish; beams are safety yellow enamel finish**

Easily assembled Penco pallet racks are designed to store palletized and other heavy bulk loads handled by mechanical equipment. These racks provide safe, flexible storage to suit all your pallet storage needs. Not to be used as scaffolding.

Upright frames are furnished completely prefabricated: two posts are securely joined by horizontal and diagonal full-channel braces MIG welded into precise alignment. Posts are 14-gauge steel, 3W x 1¾"D (18,000 lb) and 3W x 2¼"D (24,000 lb). Heavy-gauge steel foot plates welded to the bottom of each post distribute the load and provide for anchoring racks to the floor. M-design recessed post gives added strength to the columns. Beam support slots accurately punched full length on 3" centers offer convenience of space adjustment at any time. Posts come in 96, 120, 144 and 192" heights; 36 and 42" depths. Gray enamel finish.

Penco beams are 14-gauge steel, roll formed in one piece with overlapping seam and beam end connector securely MIG welded for strength. M-design recessed configuration provides strength and protects locking key. Beam end connector is a 3 x 8½" oversize reinforced three-prong connection which gives a tight fit and increases lateral stability. Beams are 96, 108 and 120" long, 2¾" wide with 1⅝" step. Safety yellow enamel finish.

HOW TO ORDER Construct starter unit with two upright frames and two beams per shelf. Construct add-on units with one frame and two beams per shelf. Minimum of two shelf levels, or four beams, required per bay for safety.

Frames

Height: Calculate total height of loads to be stored. Allow 4-6" minimum clearance between top of load and beam above it.

Depth: Allow 3" pallet overhang at both front and back of frame.

Total Weight: Total weight stored per bay must not exceed the load capacity given in the tables below.

Beams—To calculate beam length allow 3-4" clearance between pallet and upright, 4" clearance between two pallets. Capacity limit given in the tables are based on evenly distributed loads. Add 11% to capacity requirement for 3 pallets wide. Add 25% of one pallet load to required capacity for shock loads if needed.

PALLET STORAGE RACK SPECIFICATIONS AND ORDERING DATA

Description	Dimensions H	D	Panels	Maximum Load Capacity per Bay	Penco Model	Stock No.	List	Each	Shpg. Wt.
Frame	96"	36"	2	18,000 lbs	5FE096C	**3W346**	$72.60	**$57.26**	47.0
Frame	96	42	2	18,000	5FH096C	**4W128**	75.50	**59.75**	50.0
Frame	120	36	2	18,000	5FE120C	**3W345**	83.95	**66.51**	56.0
Frame	120	42	2	18,000	5FH120C	**3W344**	87.33	**69.32**	59.0
Frame	144	36	3	18,000	5FE144C	**3W343**	107.12	**84.25**	68.0
Frame	144	42	3	18,000	5FH144C	**3W342**	110.90	**87.69**	73.0
Frame	120	42	2	24,000	5GH120C	**4W129**	92.86	**73.93**	64.0
Frame	144	42	3	24,000	5GH144C	**4W130**	119.00	**94.22**	79.0
Frame	192	42	3	24,000	5GH192C	**4W131**	144.31	**114.99**	100.0

Description	Dimensions H	Clear Span	Load Capacity Per Pair	Penco Model	Stock No.	List	Each	Shpg. Wt.
Beam	3⅜"	96"	4261 lbs	5BD096	**3W347**	$42.94	**$34.26**	30.0
Beam	4⅜₁₆	96	6225	5BJ096	**3W348**	46.40	**37.13**	33.0
Beam	5⅜	96	8282	5BS096	**4W132**	51.80	**41.47**	37.0
Beam	3¾	108	4233	5BH108	**3W349**	49.41	**39.50**	35.0
Beam	4¹¹⁄₁₆	108	6266	5BN108	**3W350**	54.20	**43.45**	39.0
Beam	4⅜₁₆	120	4344	5BJ120	**4W133**	56.50	**45.35**	41.0
Beam	5⅜	120	6595	5BS120	**4W134**	63.23	**50.78**	46.0

4.5 Energy Conservation Opportunities Rejected

Water Heater Controls. An electronic time clock with battery back-up to shut down water heaters during unoccupied periods costs approximately $100/unit. This ECO was rejected in favor of the instantaneous water heaters described in Section 4.2.1.

Lighting Upgrade Using Metal Halide or High Pressure Sodium Lighting Systems. Both metal halide and high pressure sodium (HPS) lights were evaluated to upgrade the CSF lighting system. Both type of lighting are more energy efficient than incandescent or fluorescent lights and can handle the low temperatures needed in freezers. In addition, average bulb life is higher for each type than for fluorescent bulbs.

Metal halide and HPS systems were rejected for two reasons. First, CSF ceilings are relatively low (10-11 feet in most areas), and both types of lighting normally utilize deep fixtures more designed for high bays. A resultant decrease in light distribution and maneuverability in work areas was not attractive. Second, although metal halide lamps produce white light, HPS light is yellow. A yellow light would not be acceptable in office areas. In addition, workers have reported headaches from changing between yellow and white light during the work day, so a combination of the two was unacceptable.

Peak-shaving generators. Observation of the electrical demand records shows that the building has a relatively constant electrical load of about 120 kW, and during business hours, and increased load of about 170 kW. An engine-driven generator could be installed to offset the 50 kW business hours increase. The result would probably be a decrease of a similar amount in the overall Ft. Campbell demand, since peak demands coincide reasonably well. If the peak demand is reduced by 50 kW, the demand charge of $12.01/month/kW would be avoided. Thus an annual saving of about $7200 would be achieved. Operating costs, however, total about $10,000 per year, so this ECO was rejected.

A 50 kW diesel generator, with controls, wiring, above ground fuel tank, concrete pad, and installation would cost about $22,000. Payback is under 3.5 years. Note that other

recommendations herein may act to reduce both the continuous electrical load and the business hours increase. Note also that a diesel generator would probably require an air emission permit with associated fees.

Light-colored roof. The existing roof is black. A light-colored roof would reduce heat gain through the roof. A polyurethane roof surface is available, but can not be applied over the existing roof, i.e., the roof must be replaced. The cost of a new roof (approximately $68,000) compared to the energy savings (approximately 98 MBTU/year) does not make this economical as a project. The differential cost of a white roof and a black roof is estimated to be approximately $25,000. When the roof is scheduled to be replaced, more detailed cost estimates and analysis should be performed to evaluate the attractiveness of a light-colored roof.

Replace existing doors with automatic sliding doors. The following doors were investigated for replacement.

- West end of Issue Room: pressure plate sliding doors (2), lockable
- Mini-Mart east (1) and west (1) doors: pressure plate sliding doors, lockable
- Doors (2) from old breezeway to north storage staging area: pressure plate sliding doors, lockable
- Pressure plate sliding doors with interior emergency exit provision for the following refrigerated storage rooms: North Freezer (VF1), Oleo Room, Meat Freezer, Egg Room, Vegetable Freezer (VF2), Vegetable Cooler (PC2), Mini-Mart Storage area (C4)

This ECO was rejected due to the high cost of the doors (approximately $6900 each) compared with modest energy savings. While automatic doors would increase operational efficiency, they are not economical at this time. Automatic doors should, however, be considered during the course of routine door replacement.

Add Panel Insulation to Refrigerators and Freezers. Adding two inches of insulation to the inside of each compartment would reduce heat gain and save energy. Estimated cost (11 rooms) is $33,600. The modest energy savings, however, could not justify this expenditure.

Motion-sensors to control incandescent lights in refrigerated and ambient areas. The source of lighting in the Cold Storage Facility is almost entirely composed of incandescent lamps. These lamps have shorter liver (750 hr) and lower efficiencies (17 lumens/watt) than fluorescent or HID lamps. However, they are not affected adversely by frequent starts. Therefore one option evaluated for energy reduction was to install occupancy sensors to switch the lights off when the room is unoccupied. Review of the Daily Load Profiles taken by TVA personnel show very constant loads which could indicate that lights are not being switched off at night. If the 33,850W of lights now burn constantly, switching 80% of them off after business hours (128 hours/week) would save approximately 740 MBTU/year. Sensors to activate the lights would cost about $100/each, or $2,200. Economically this is an attractive proposal, with a payback of approximately 2 months.

This ECO is not recommended because the option of installing fluorescent lamps discussed in Section 4.2.2 is better from a safety standpoint and can have comparable savings if some of the lights are manually turned off after business hours.

Compressor Size, Type, and Efficiency. The compressors at the CSF are acceptable for continued use, barring any maintenance problems we're not aware of. The efficiency is similar to what could be purchased today new, and aside from increasing the area of the evaporator or condenser coils to lower the pressure differential, little further improvement in efficiency would be expected. With the addition of high efficiency motors (see Section 4.2.6), they should be very satisfactory.

Refrigerants. The summary of refrigeration systems (Appendix 3) shows that the Central Low Temperature (0F) and four of the packaged systems use R-502 and two packaged systems use R-22. These refrigerants are CFCs and are going out of production under the Montreal Protocol and the Clean Air Act. Army Technical Note 420-54-01 (26 June 1991) states that existing equipment must remain in operation until it can be economically replaced.

Manufacturers are developing replacement refrigerants such as R-134a for R-12 and new systems are using R-22 in lieu of R-502. However, these are not "drop-in" refrigerants. Mixtures of refrigerants now becoming available may offer a way of continuing the use of existing equipment. Among these are Dupont's SUVA MP39, MP66, HP80 and HP81.

Because this is a rapidly developing technology, and R-502 will be available in declining quantities but increasing cost for several years, it seems most prudent to delay any decisions on this subject for a few months. The best course of action - replace or continue to use, should become clearer in the near future.

Equipment location. The present location of equipment is satisfactory from a distribution standpoint. Some equipment may have to be moved because of other recommendations herein.

Improve power factor. The October 1992 electric bill from the TVA shows a 1656 kVAR lagging power factor for the entire Ft. Campbell installation. The penalty charge was $1292, which is a small percentage of the total bill of more than $800,000. Although the power factor for the CSF Mechanical Room circuit is low (70% range), it is probably not justifiable to try to improve the power factor in this one building. There may be some compensatory effect elsewhere in the installation. The addition of arc-type lamps may further decrease the power factor, but at this time, improvement is not justified.

5.0 Energy and Cost Savings

Investment costs, energy savings, and energy cost savings for recommended energy conservation opportunities are summarized in Table 7. Potential savings including estimated decreases for synergistic effects total approximately $22,329 per year (1,763 MBTU/yr). Potential savings thus account for nearly half of present energy consumption. Total investment cost is estimated at $317,107. Note that investment cost used in LCCID modeling include design and SIOH costs and are thus higher than purchase, installation, or construction costs. There are eight projects identified with energy savings. Each project has been analyzed alone, and true energy savings will be dependent on the combination of options chosen. Synergistic effects were estimated at 15%. For example, savings from additional ceiling insulation would be lower if some of the refrigerators and freezers are shut down.

Table 7.

Ft. Campbell Cold Storage Facility
Recommended Energy Conservation Opportunities

Energy Conservation Opportunity	Estimated Construction Cost ($)	Estimated Total Investment ($)	Estimated Energy Savings		Other Savings (+) or Costs (-)		Simple Payback Period (yrs)	Savings to Investment Ratio
			(MBTU/yr)	($/yr)	One-Time ($)	Annual ($/yr)		
Replace old water heaters with instantaneous heaters in restrooms and VET office	$1,040	$1,165	133	$148	–	–	7.9	3.3
Replace existing lighting which is mostly incandescent with fluorescent fixtures and lamps.	$26,210	$29,225	425	$5,518	-	($373)	5.3	2.1
Add insulation between compartment ceilings and roof	$15,000	$16,725	145	$2,016	–	–	8.3	1.7
Replace main meat freezer evaporators with updated electric defrost models	$48,000	$53,760	122	$1,700	–	$4,500	8.6	1.5
Install plastic curtains on doors without them and reseal all cooler doors	$6,250	$6,969	54	$752	–	–	9.3	1.5
Install High-Efficiency Compressor Motors on Central Medium and Low Temperature Systems	$7,800	$8,697	64	$897	–	–	9.7	1.4
Replace boiler, install HVAC systems, enclose docks, move forklifts, shut down oleo room, north freezer, free-standing freezer, repipe Mini-Mart Egg and Mini-Mart Produce to make freezers, remove unused equipment from CSF	$127,063	$142,311	742	$9,151	$58,605	–	11.7	1.3
Computerized Control System for HVAC and refrigeration systems	$52,140	$58,397	389	$5,419	-	$3,288	6.7	1.2
TOTAL	$283,503	$317,107	2,074	$26,274	$58,605	$7,415	8.6	1.6
TOTAL ASSUMING 15% REDUCTION IN SAVINGS DUE TO SYNERGISTIC EFFECTS	$283,503	$317,107	1,763	$22,329	$58,605	$7,415	9.7	1.5

Ft. Campbell
Cold Storage Facility
Energy Study

APPENDIX 1

PHOTOGRAPHS

January 1993

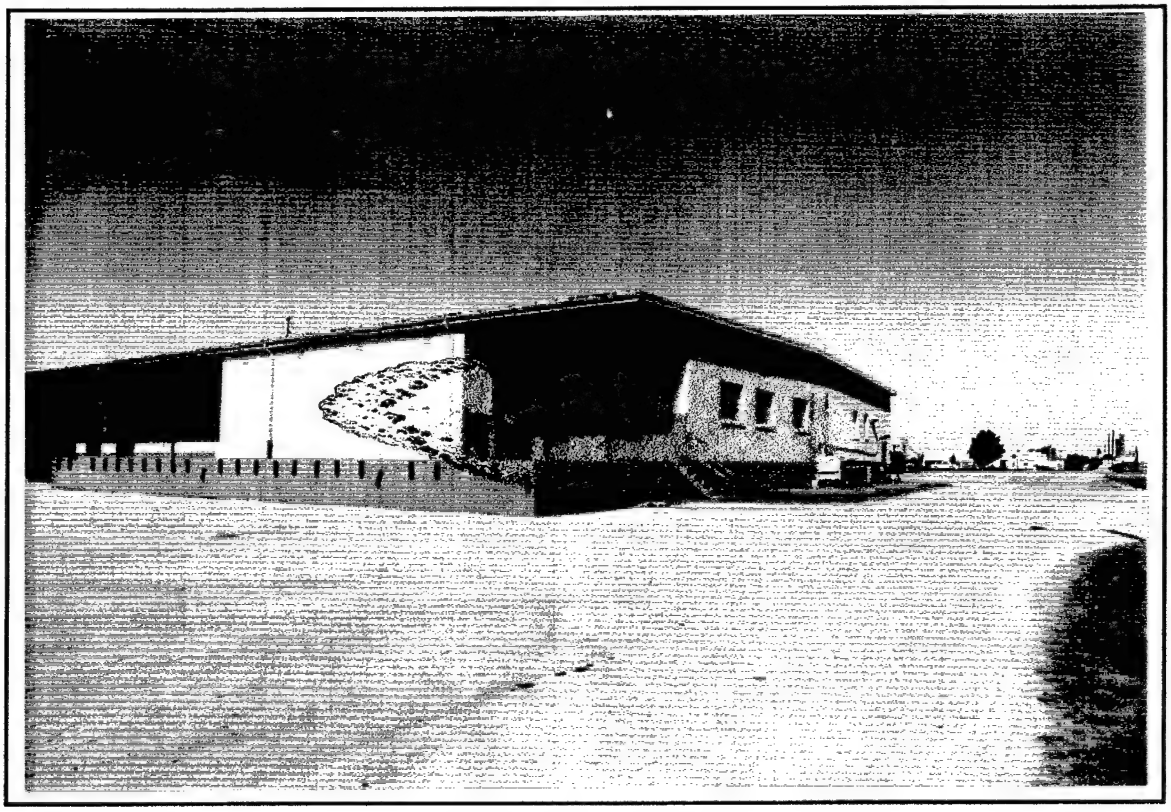


Photo 1: Mini Market Entrance

Photo 2: South View

Photo 3: South View

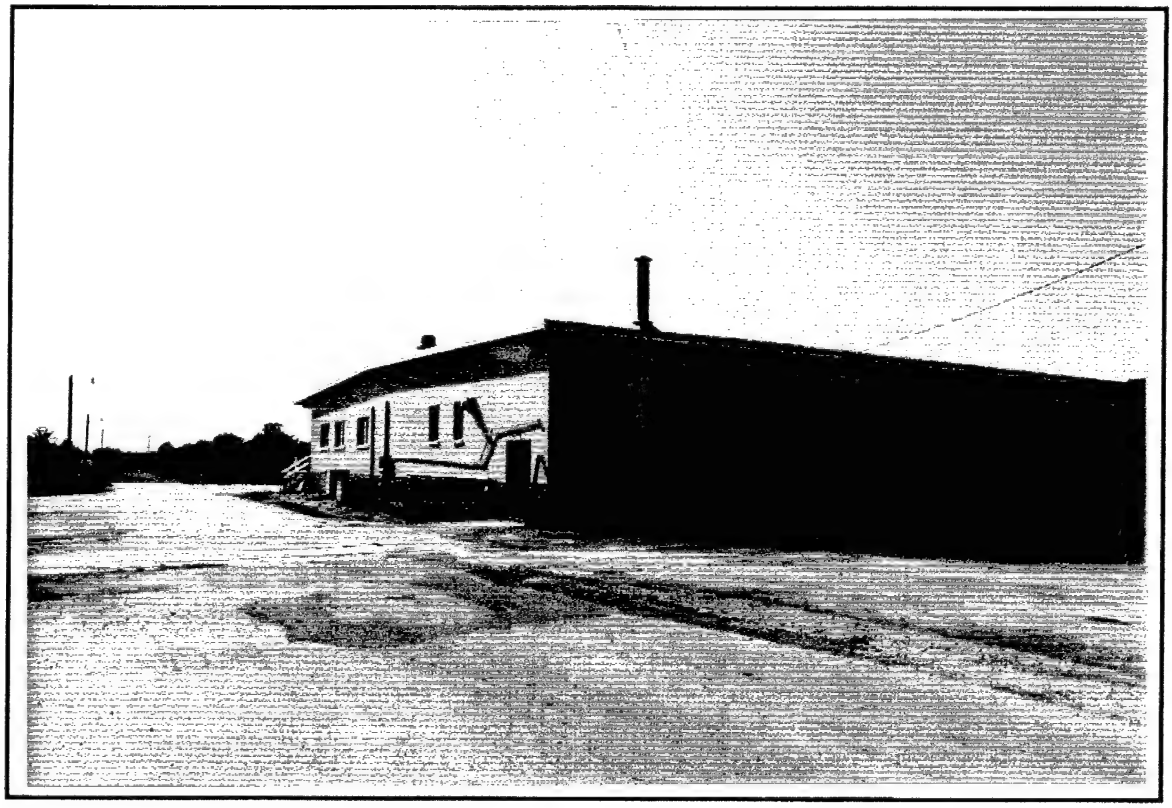


Photo 4: South-East Corner

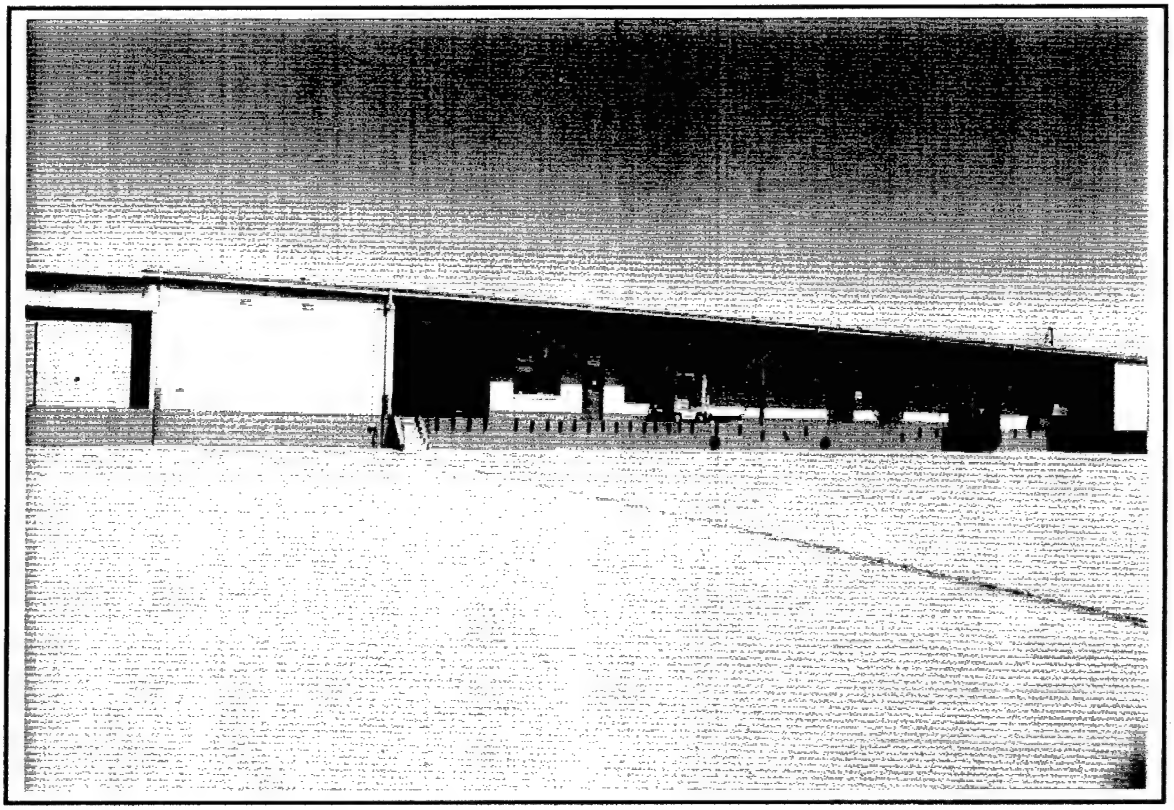


Photo 5: West Dock

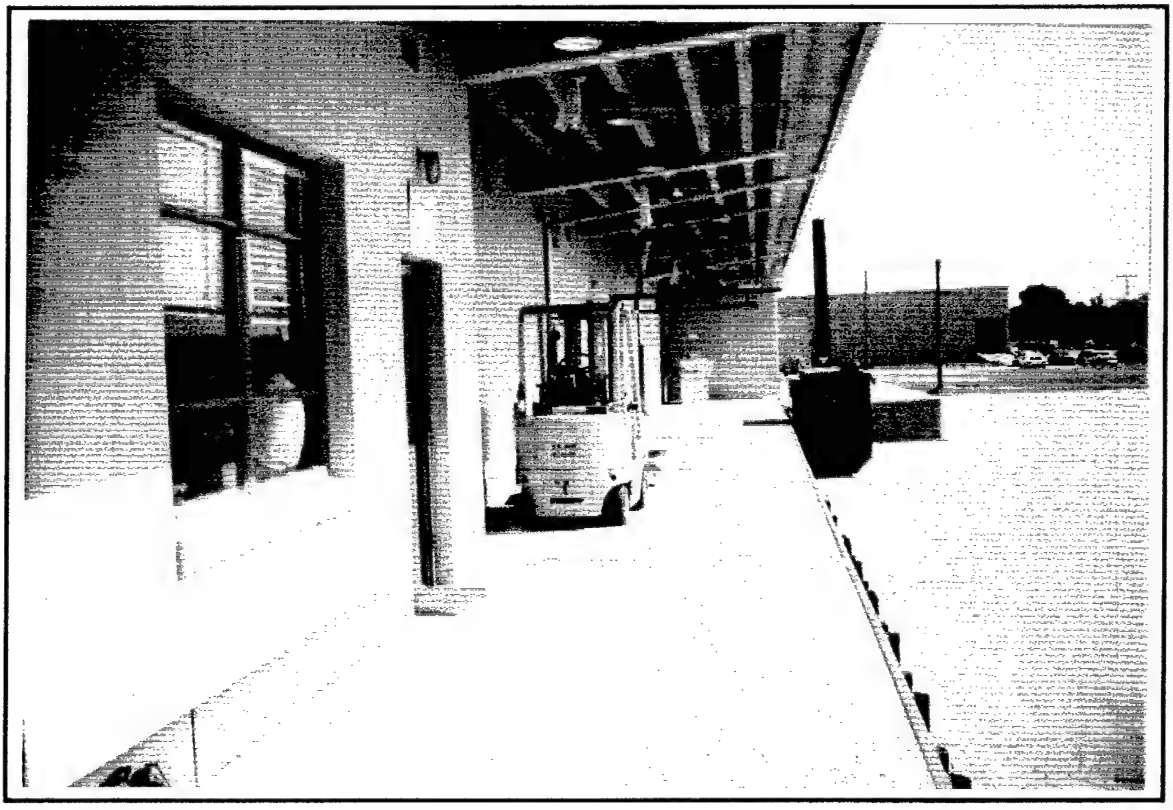


Photo 6: Showing Cold Storage Office

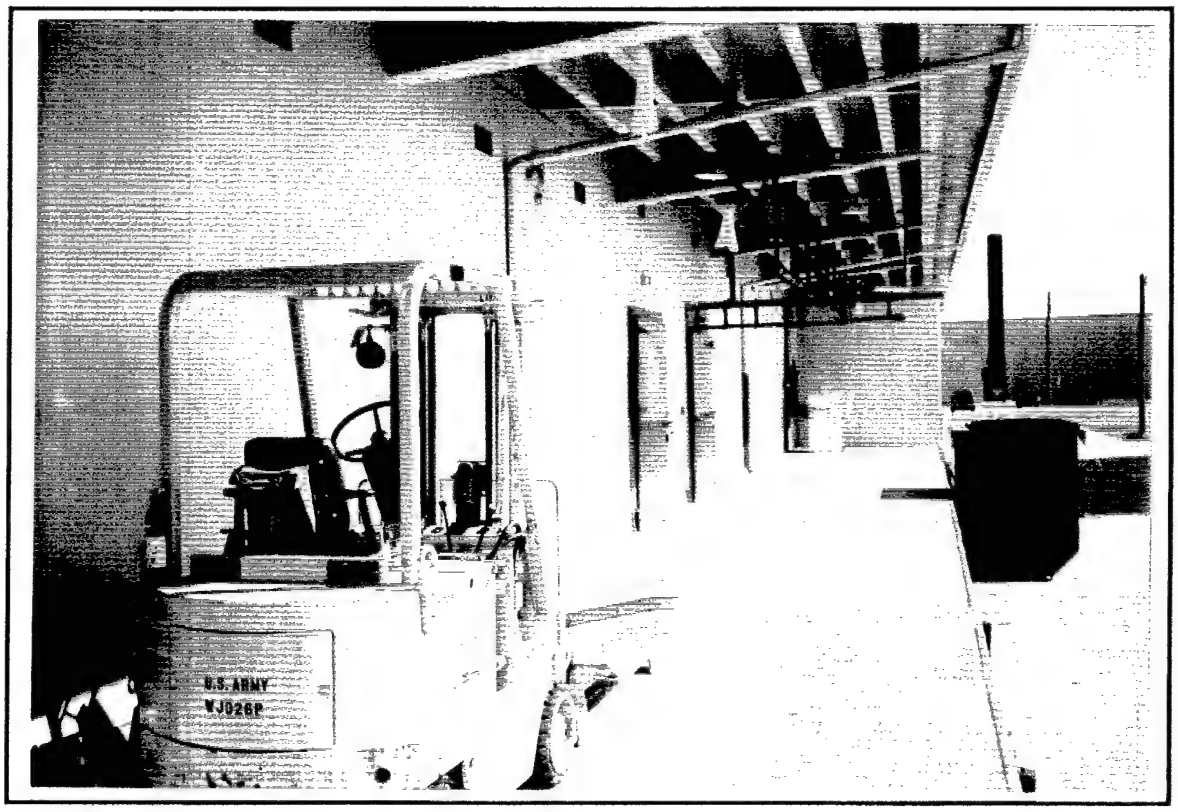


Photo 7: West Dock

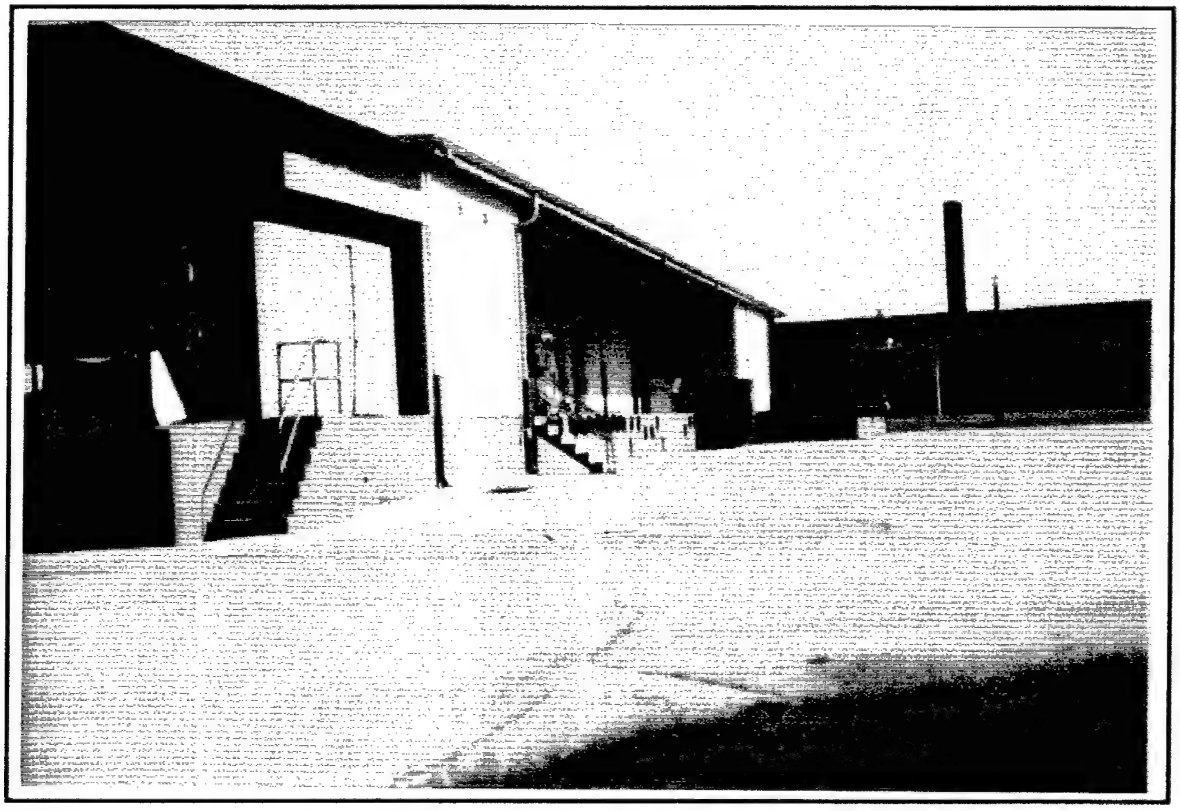


Photo 8: Loading Dock on West side of Building 5202 showing North Freezer

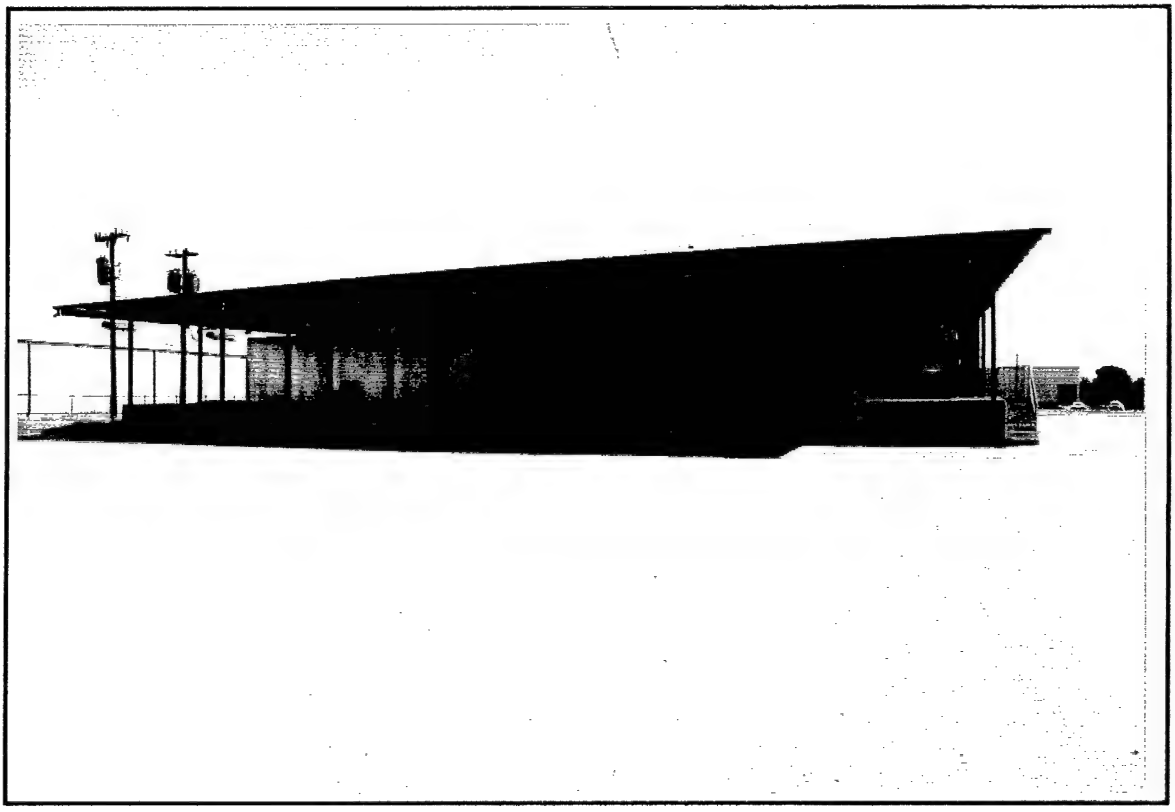


Photo 9: North Dock

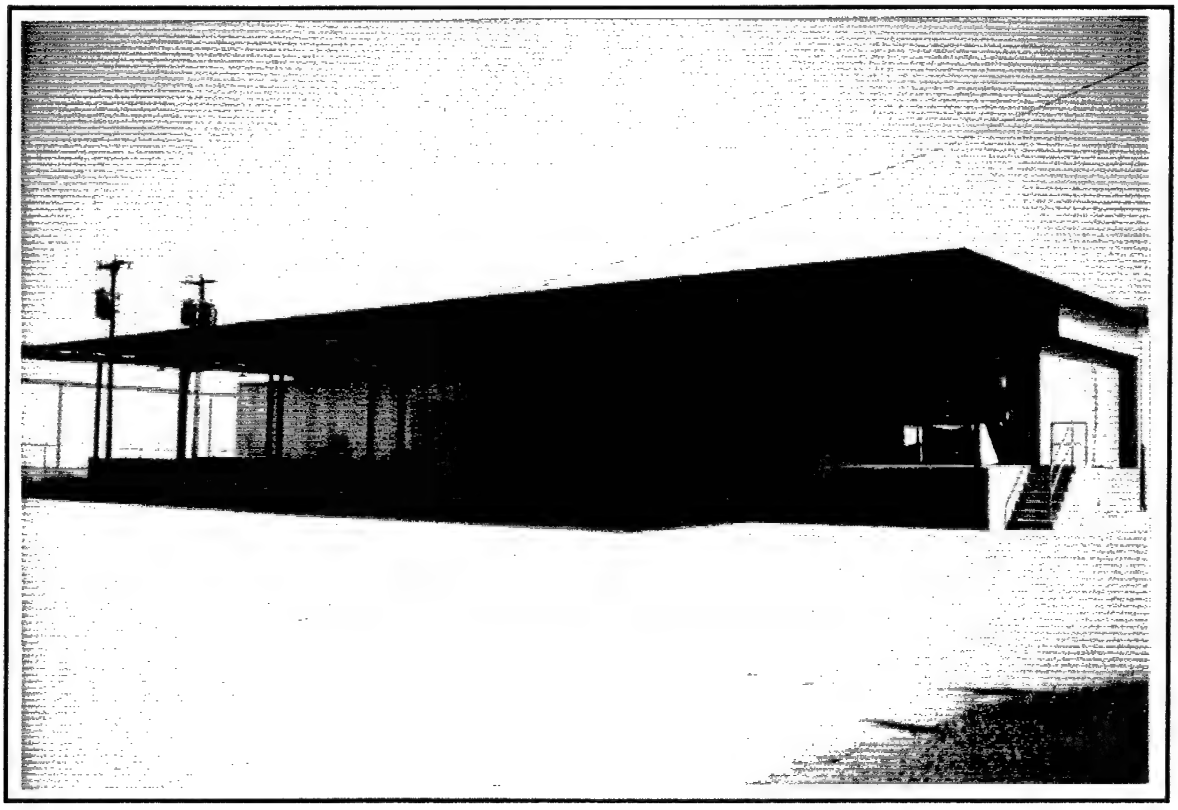


Photo 10: North Dock showing North Freezer, Oleo Room and New Freezer

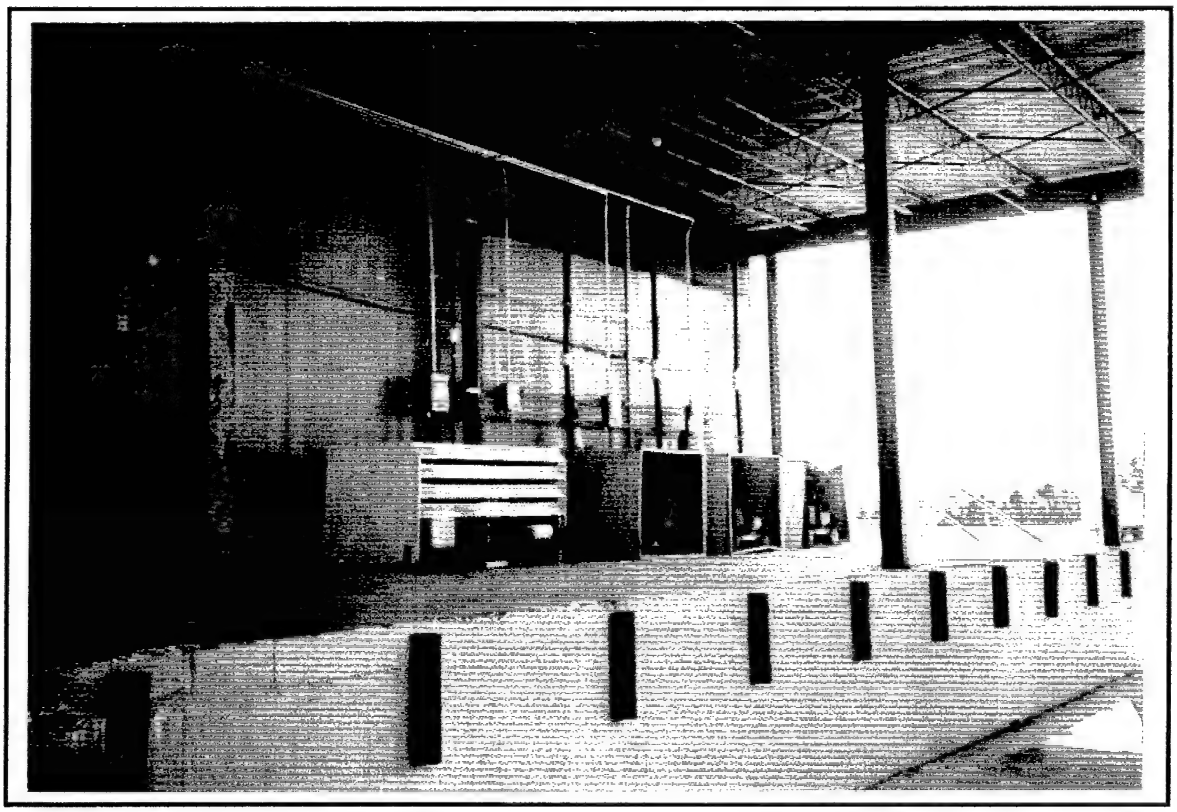


Photo 11: North Dock

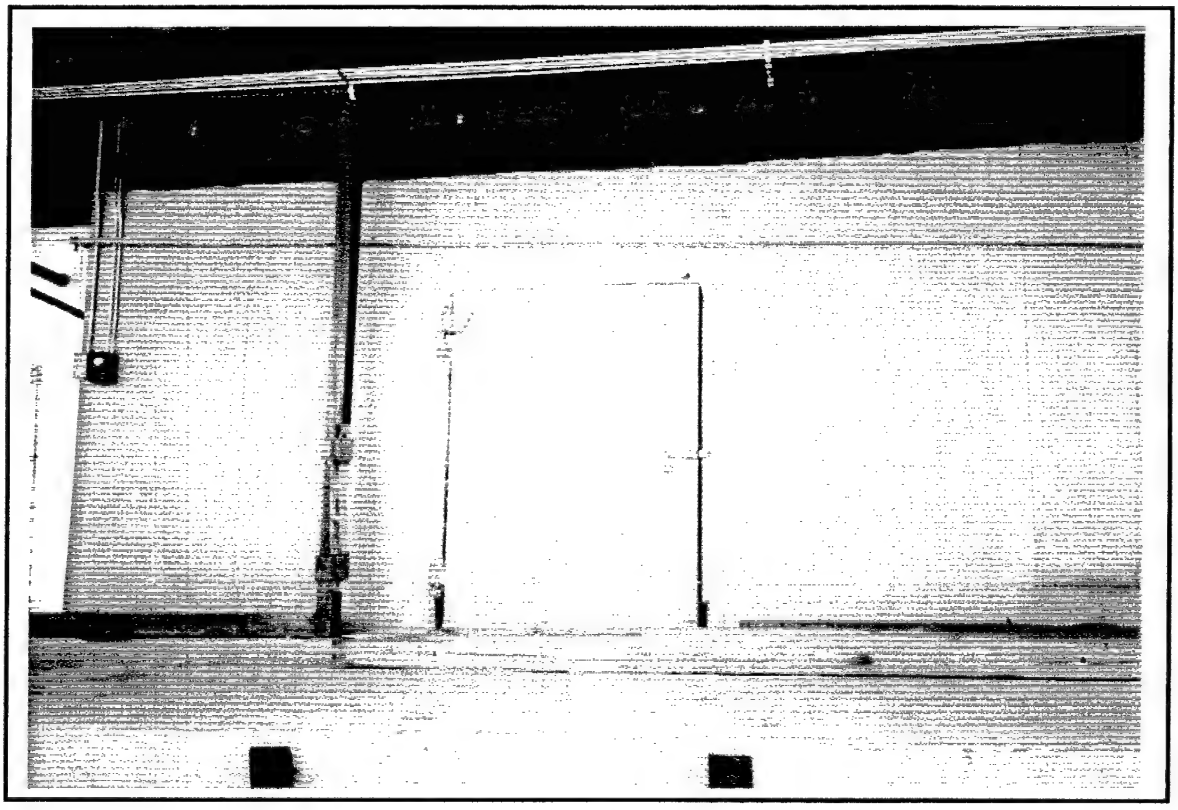


Photo 12: Outside (Blocked) Door to Oleo Room

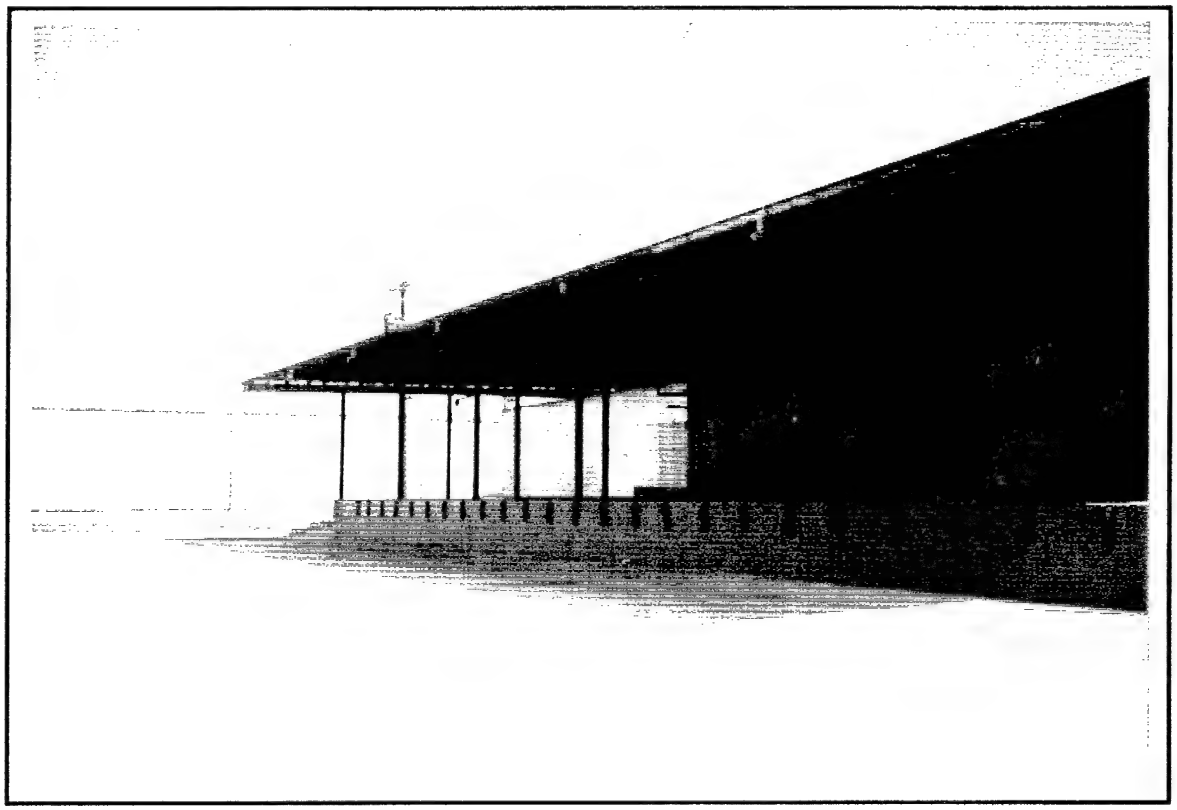


Photo 13: North Dock

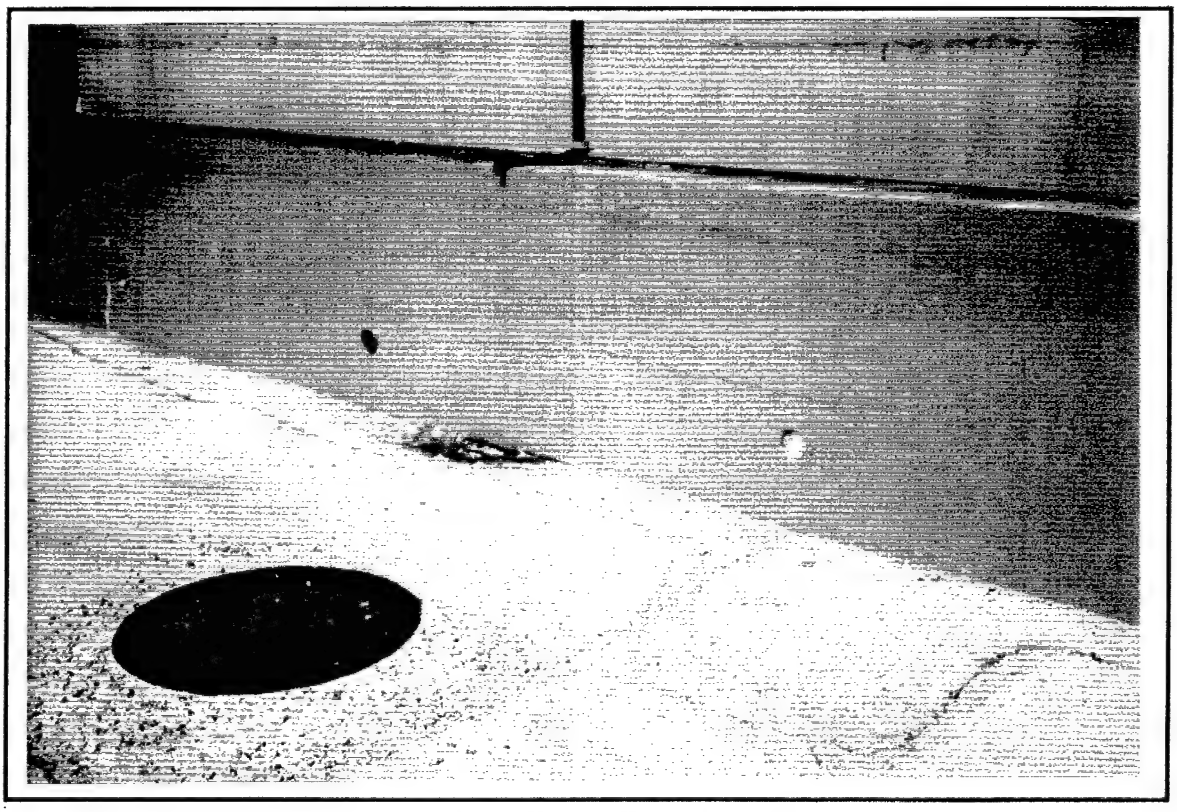


Photo 14: Condensate Drains West side under North Freezer

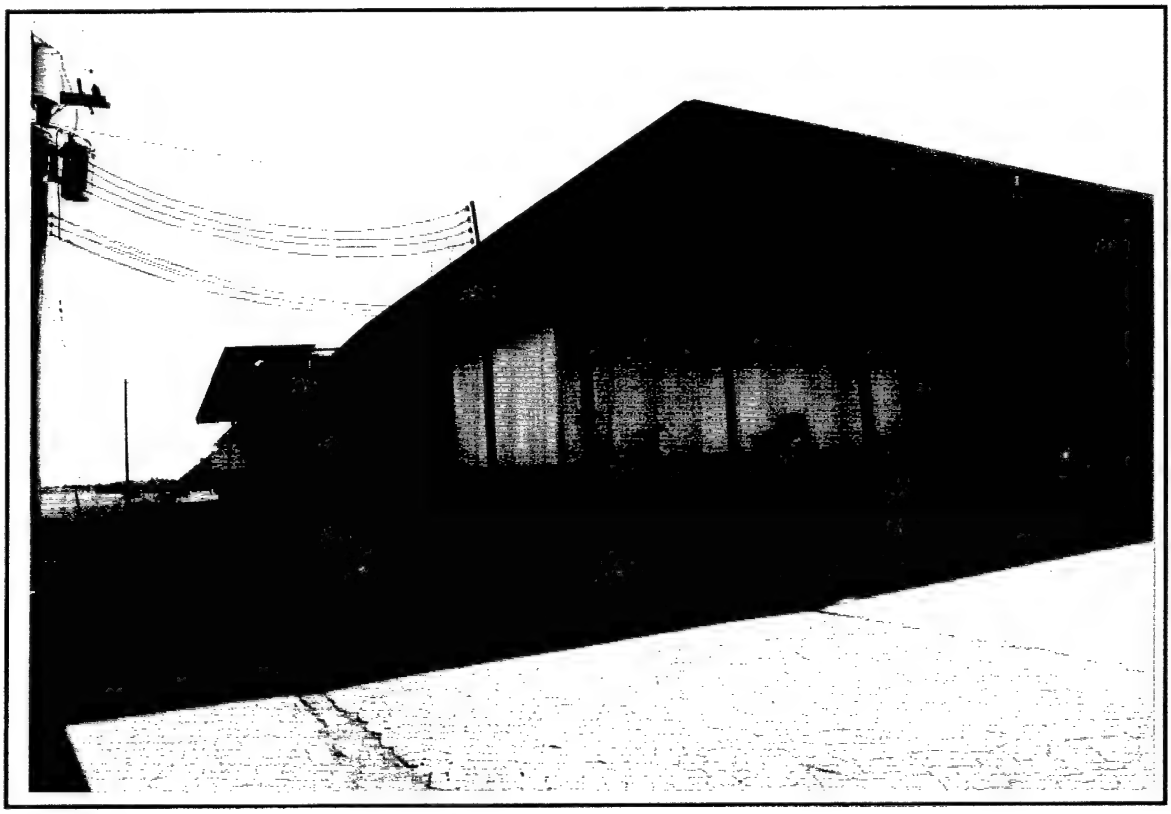


Photo 15: Northeast Corner Showing New Freezer (inoperable)

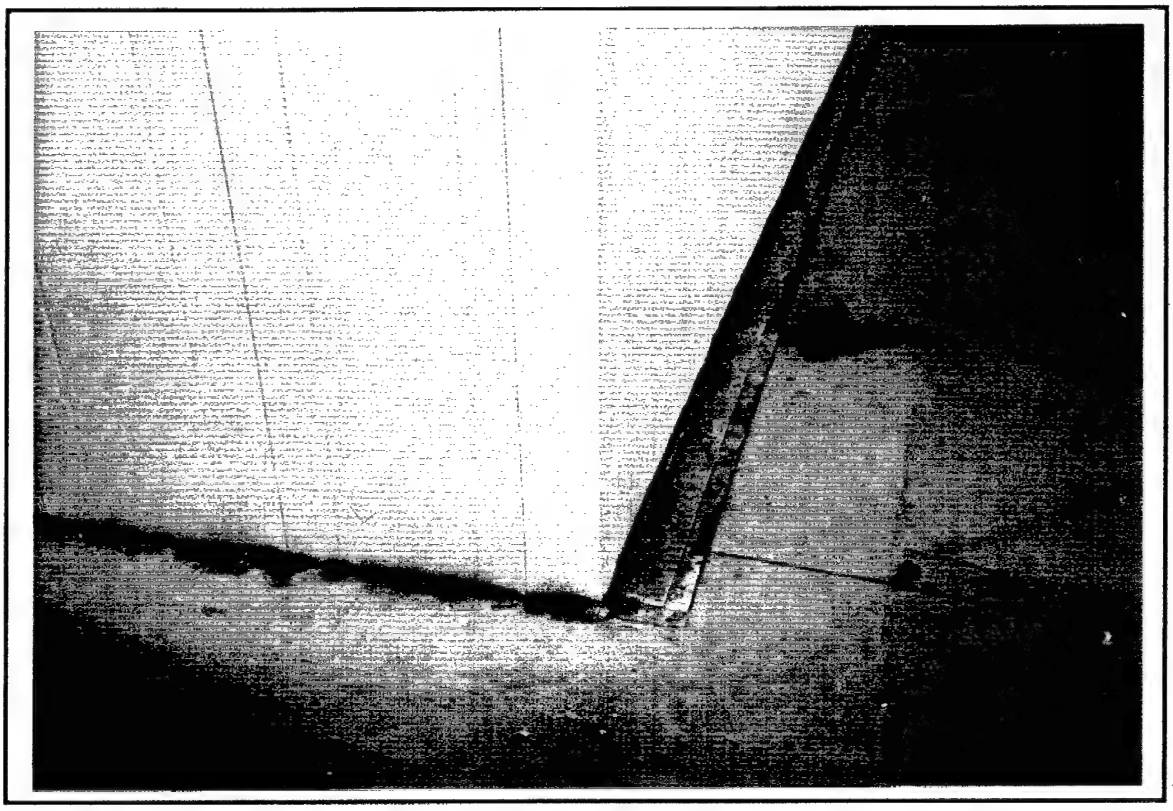


Photo 16: New Freezer showing degraded seal

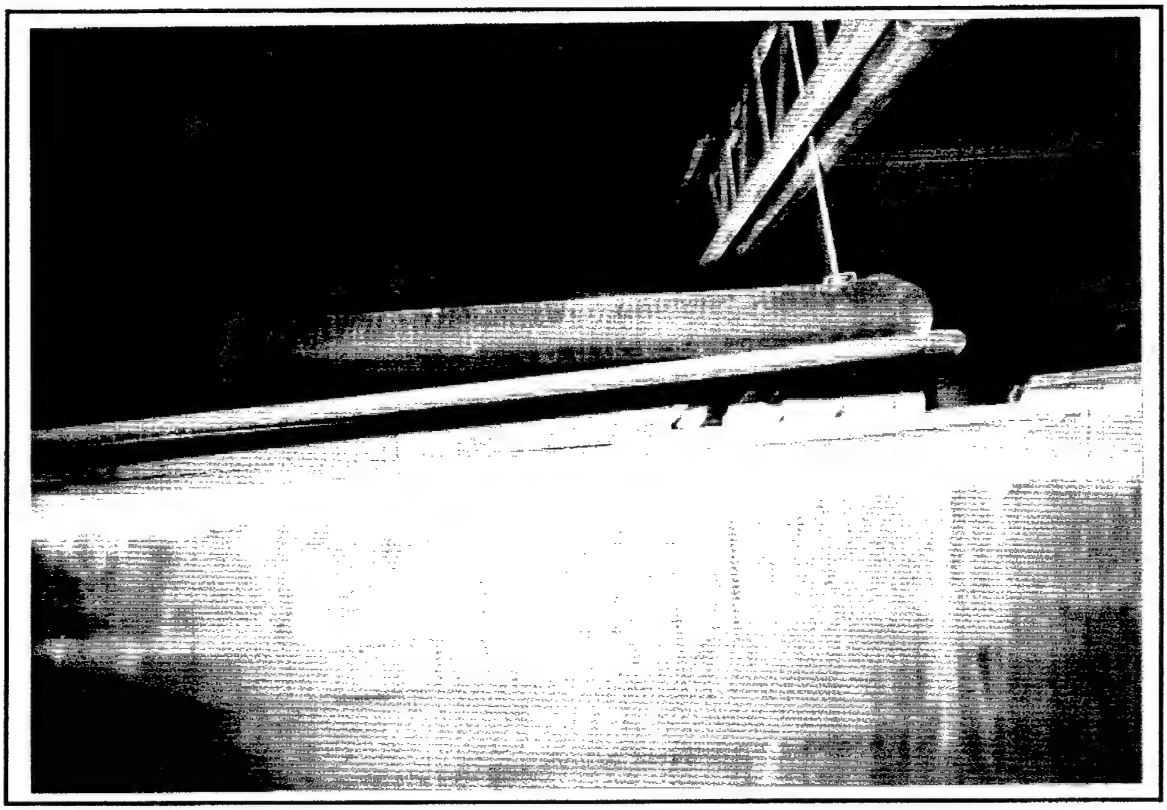


Photo 17: Above North Freezer

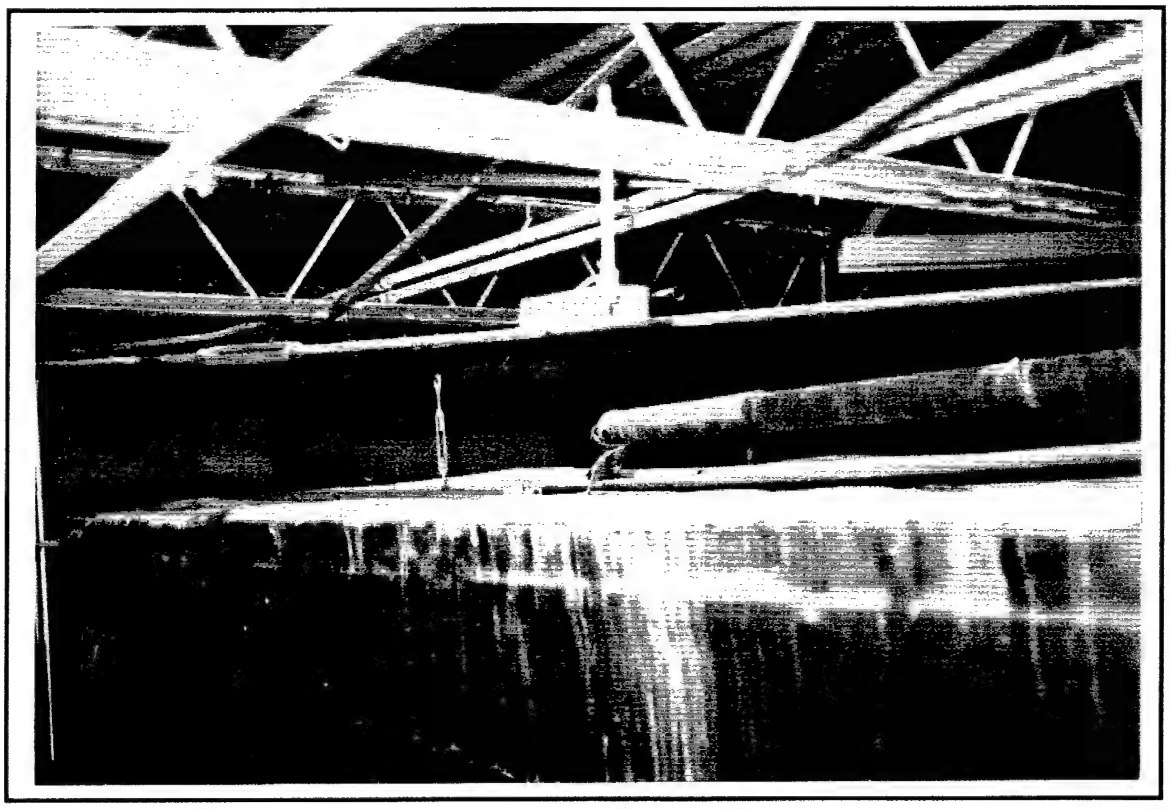


Photo 18: Above Oleo Room

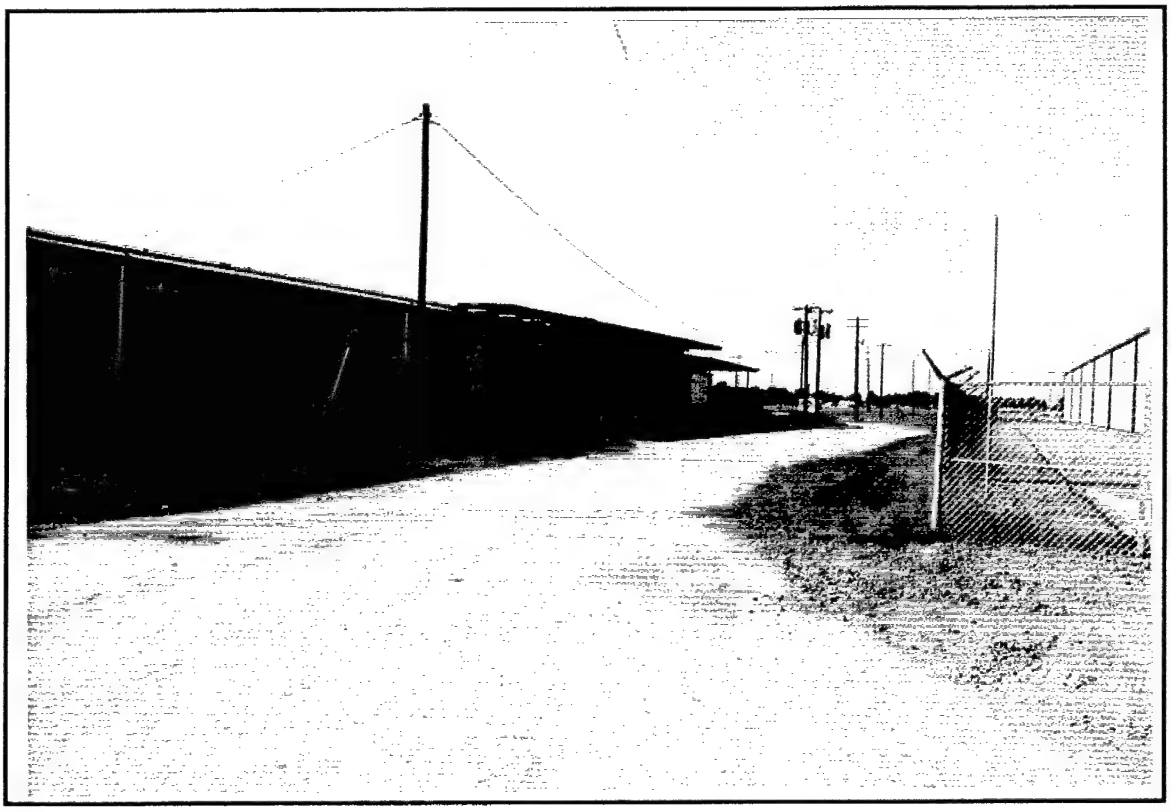


Photo 19: East Dock

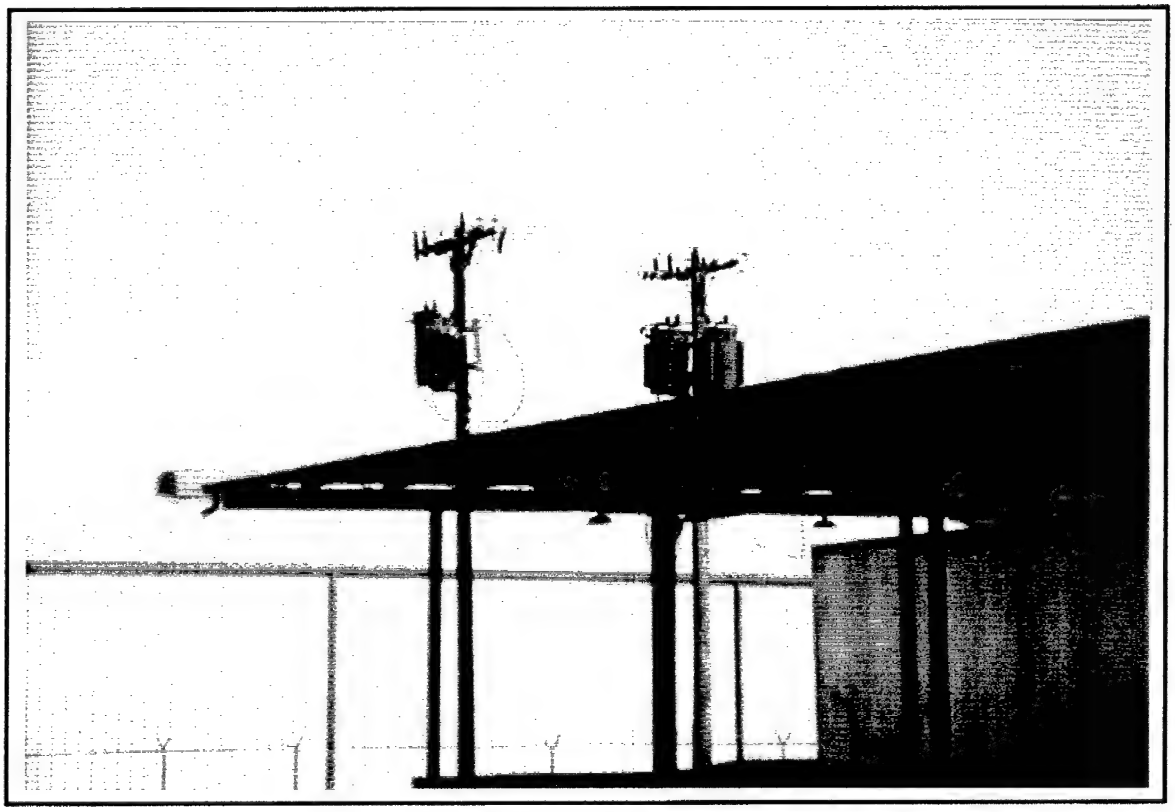


Photo 20: Transformers

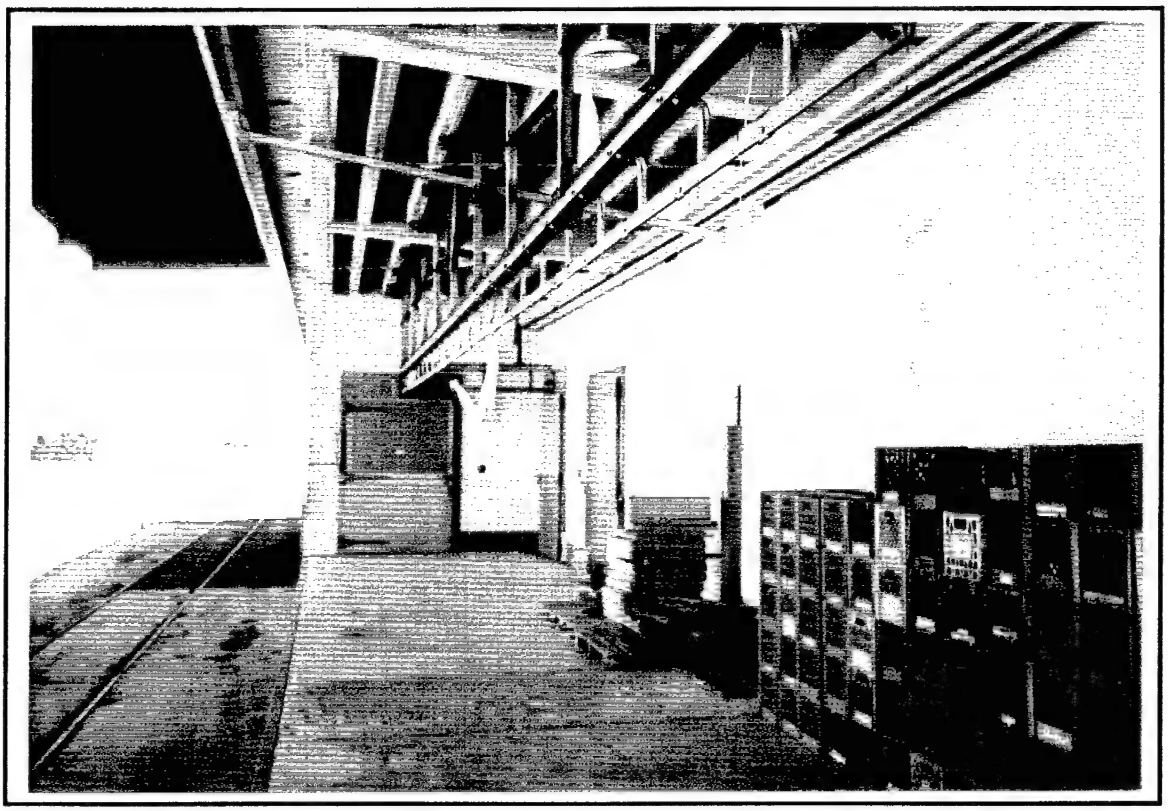


Photo 21: East Dock showing neat racks

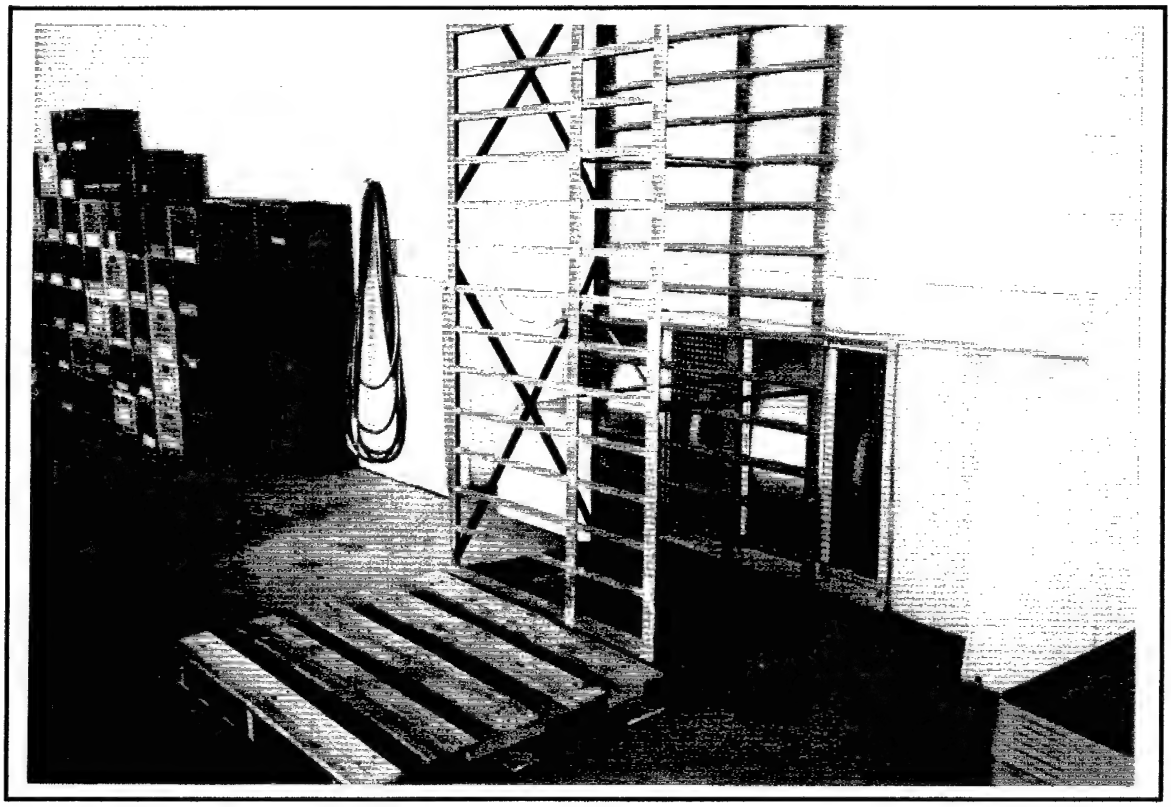


Photo 22: Condenser Fans from Mechanical Room

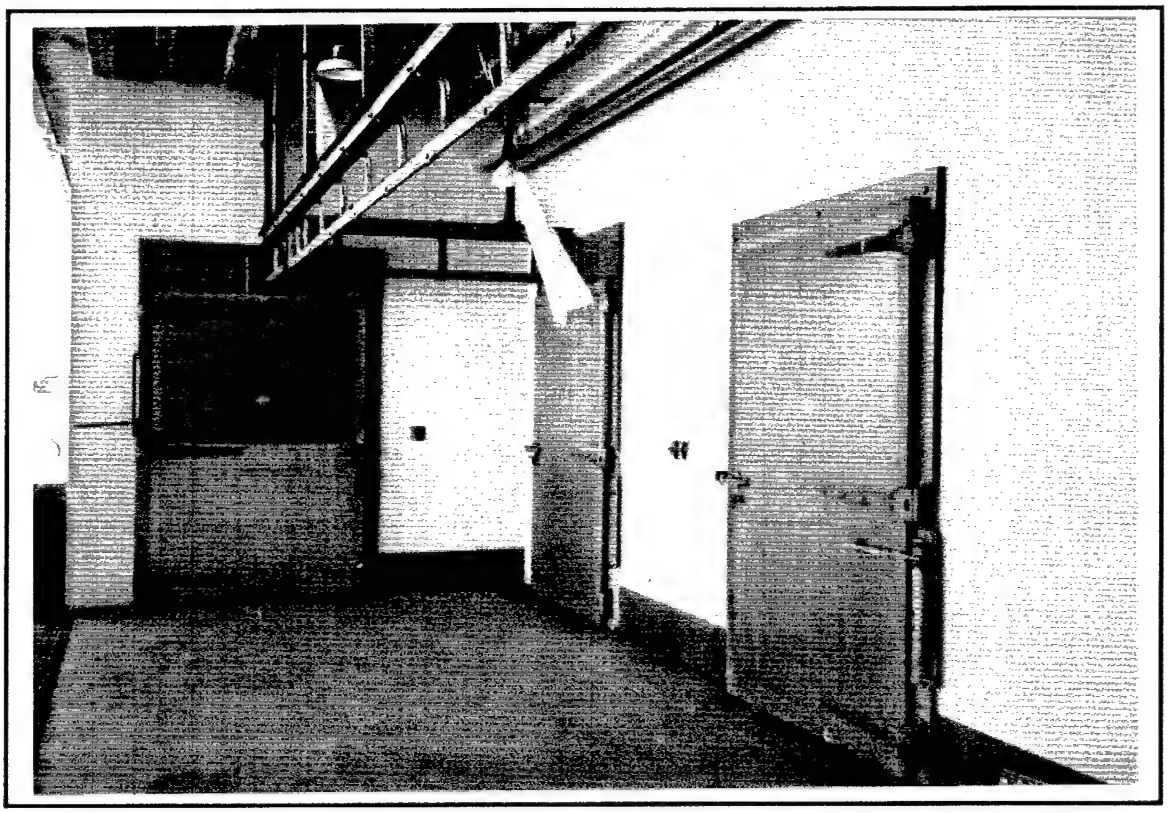


Photo 23: Doors to Mini Market Hallway and Issue Room

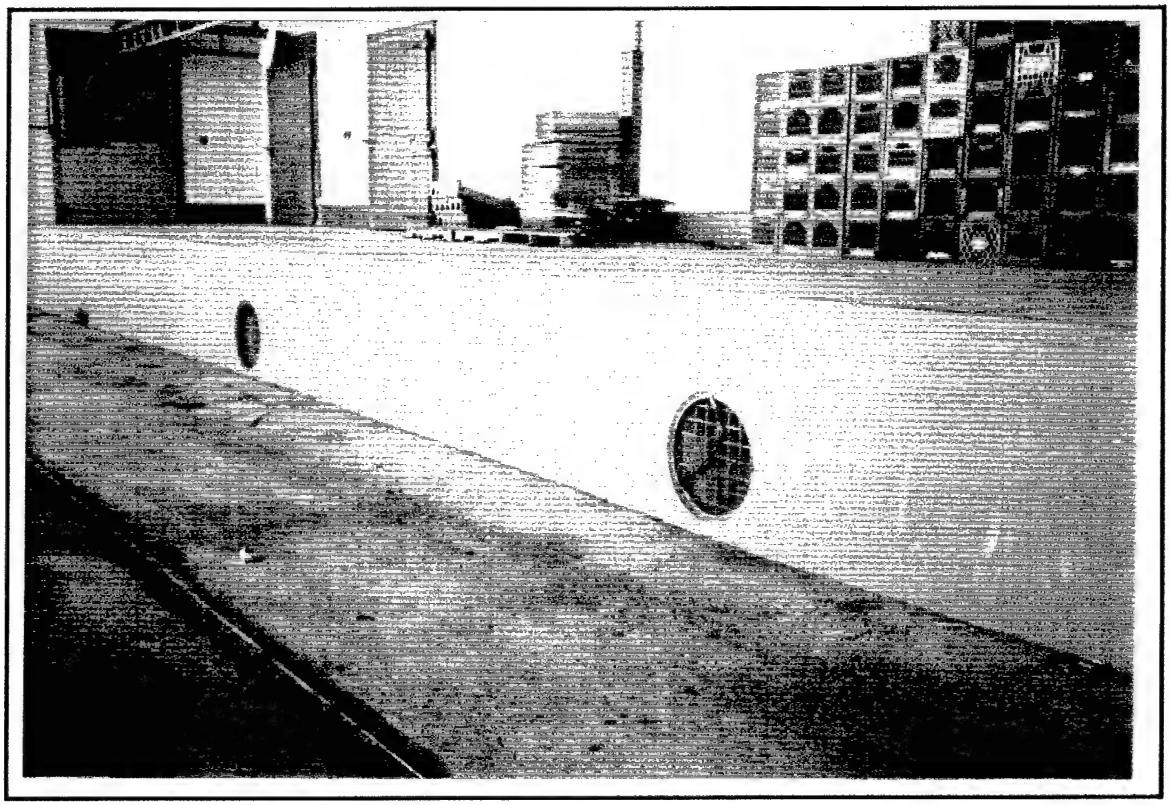


Photo 24: Condensate Drains for Meat Freezer

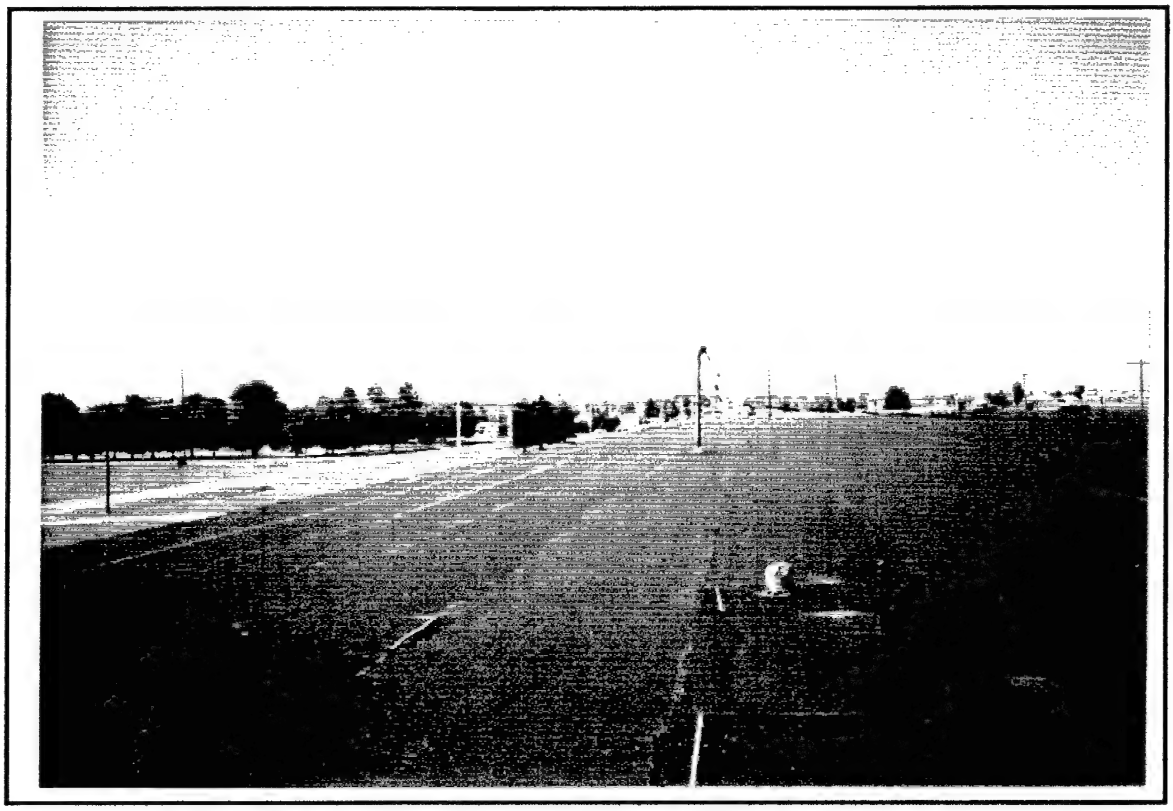


Photo 25: Roof

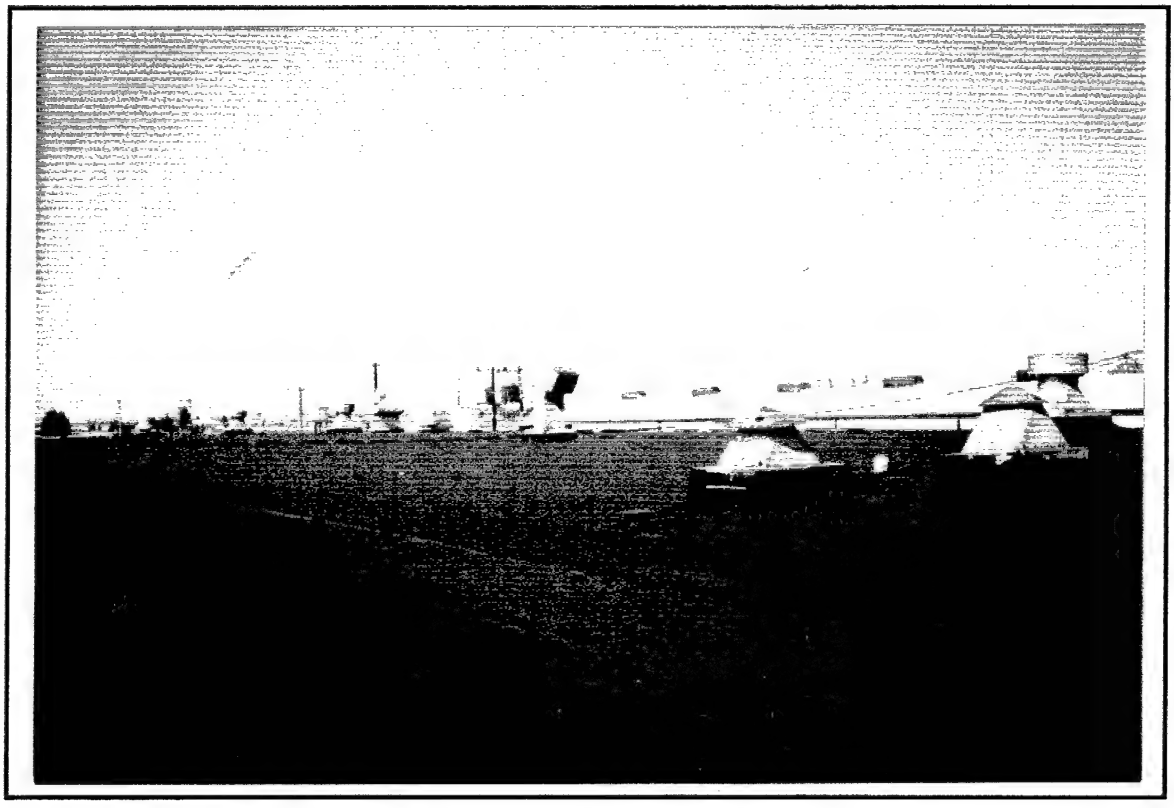


Photo 26: Roof

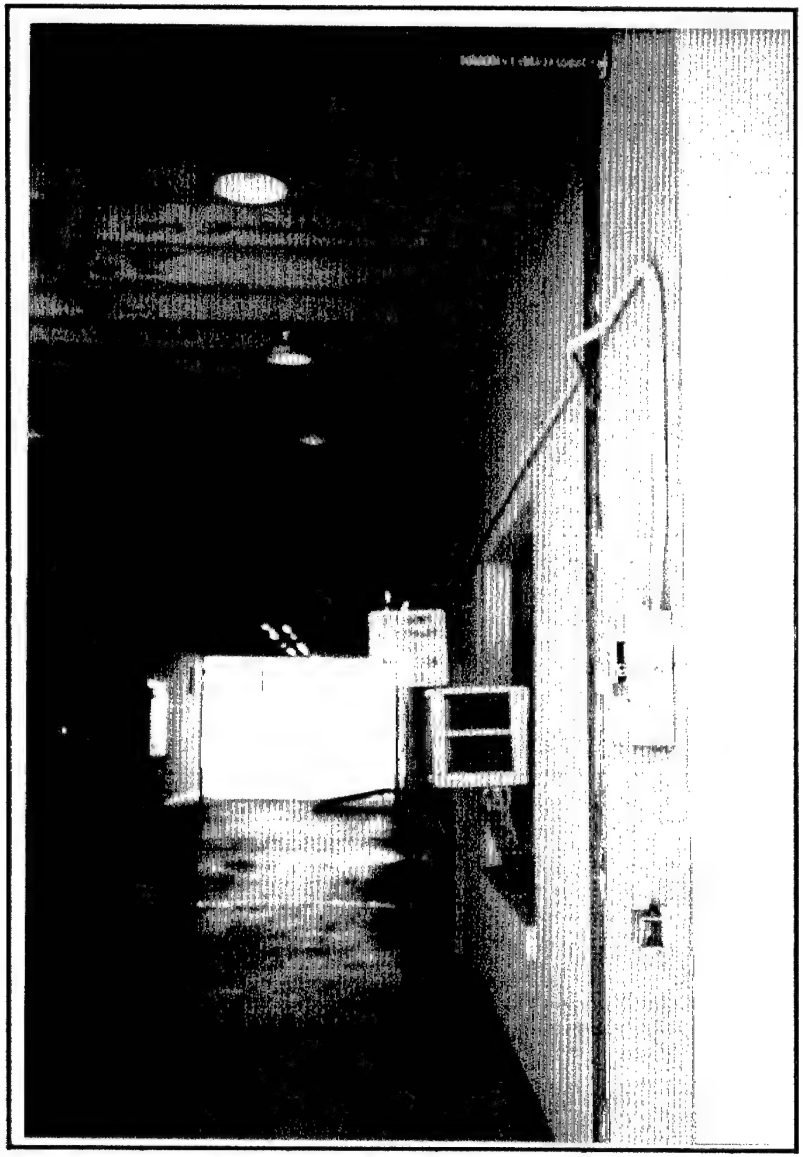


Photo 27: Breezeway Showing Vet's office

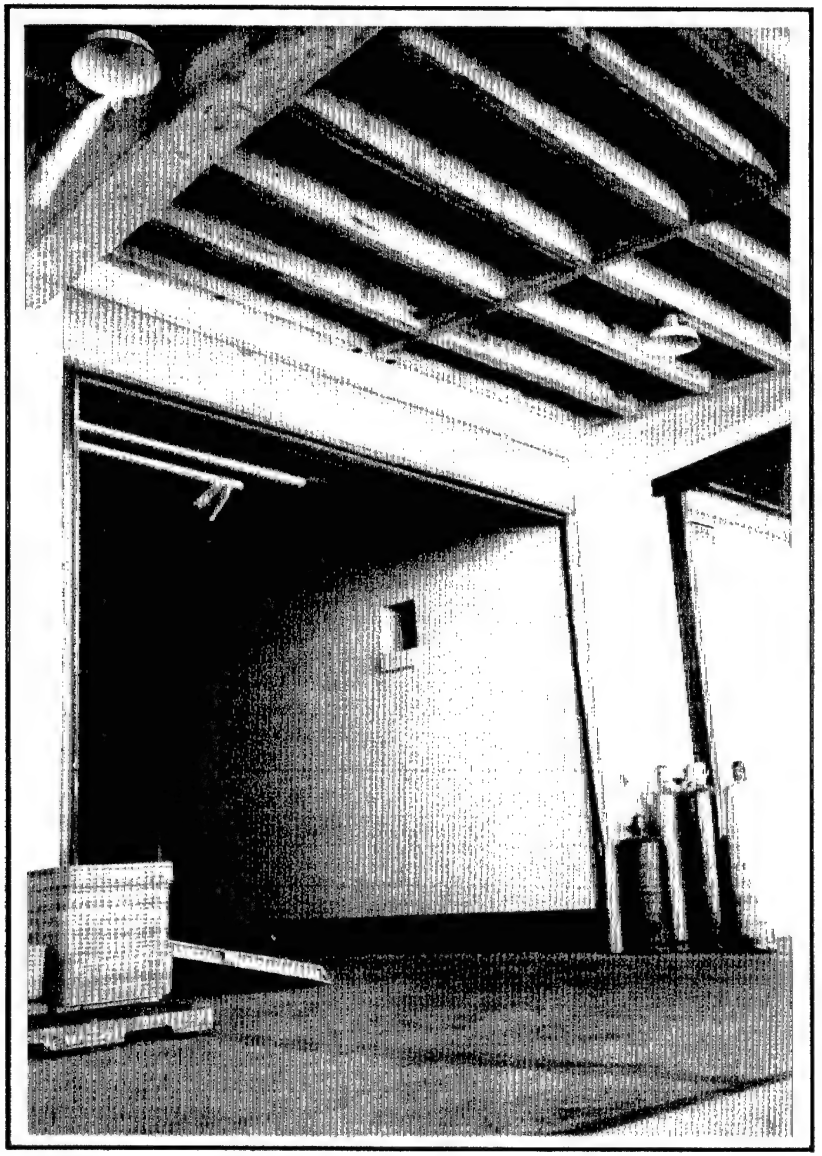


Photo 28: Breezeway

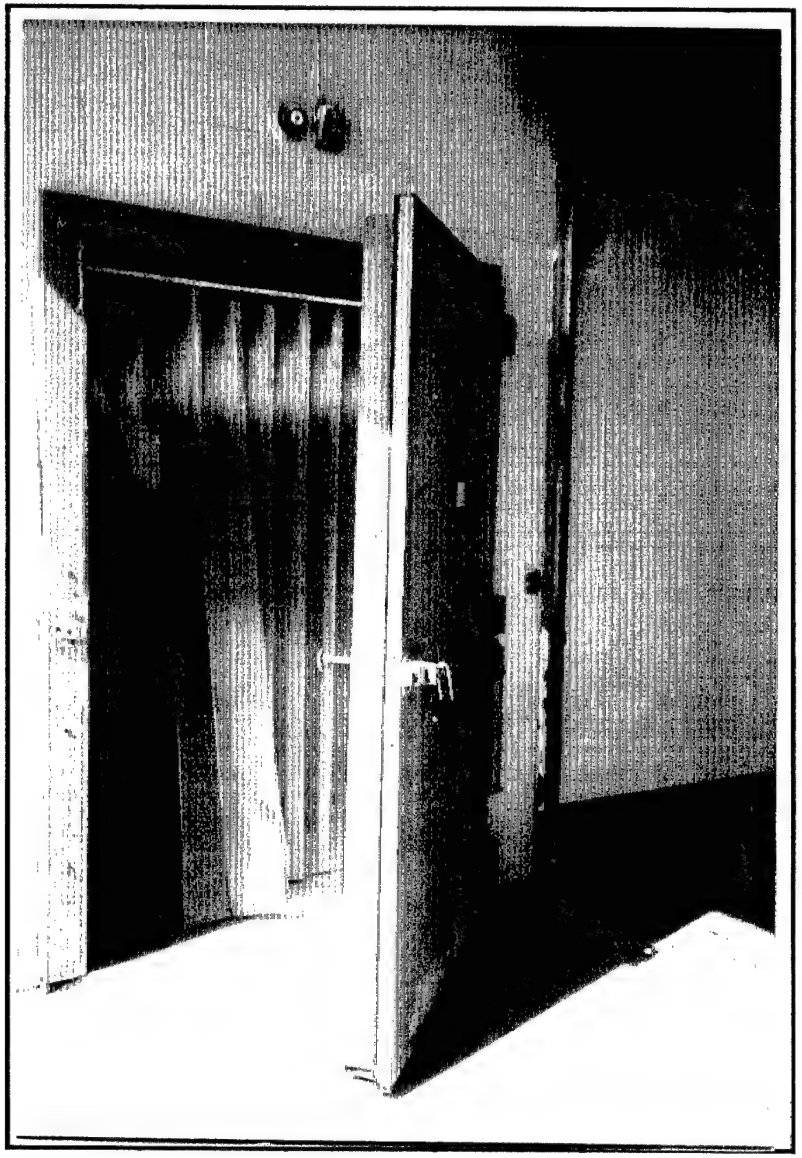


Photo 29: Ice Storage Room Door

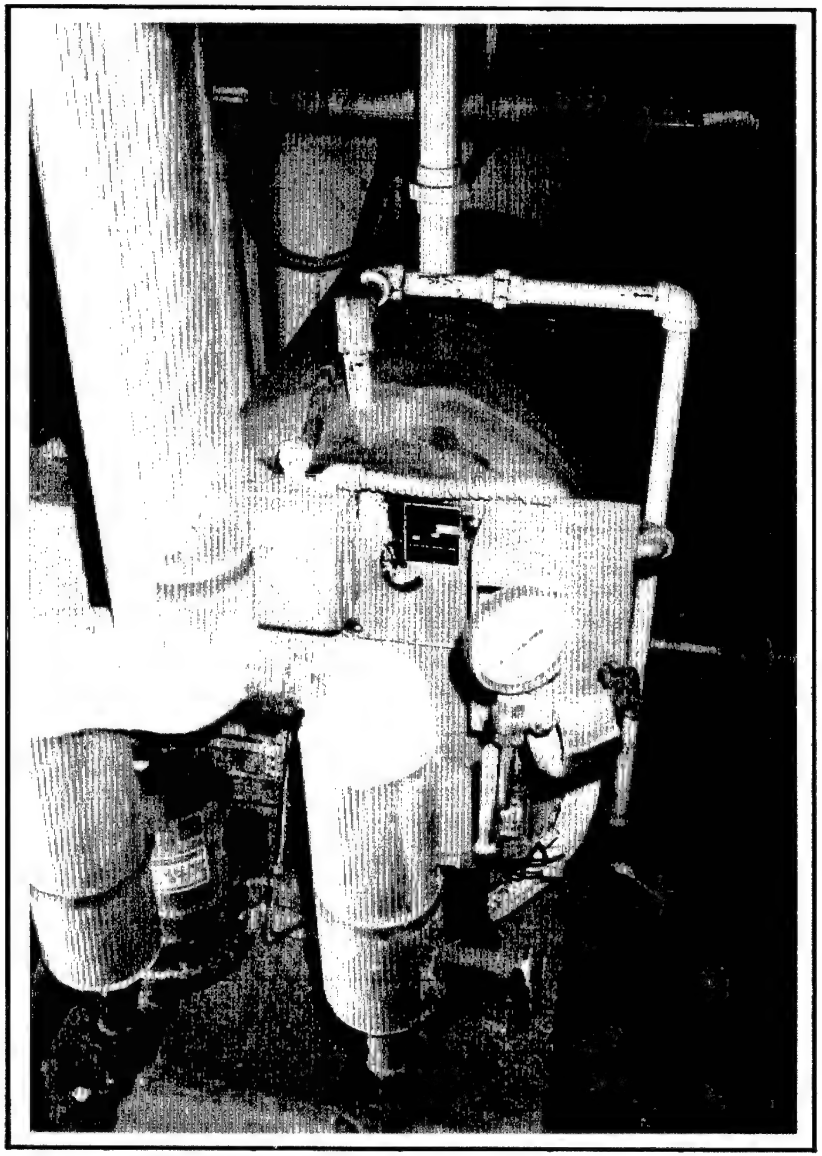


Photo 30: Boiler

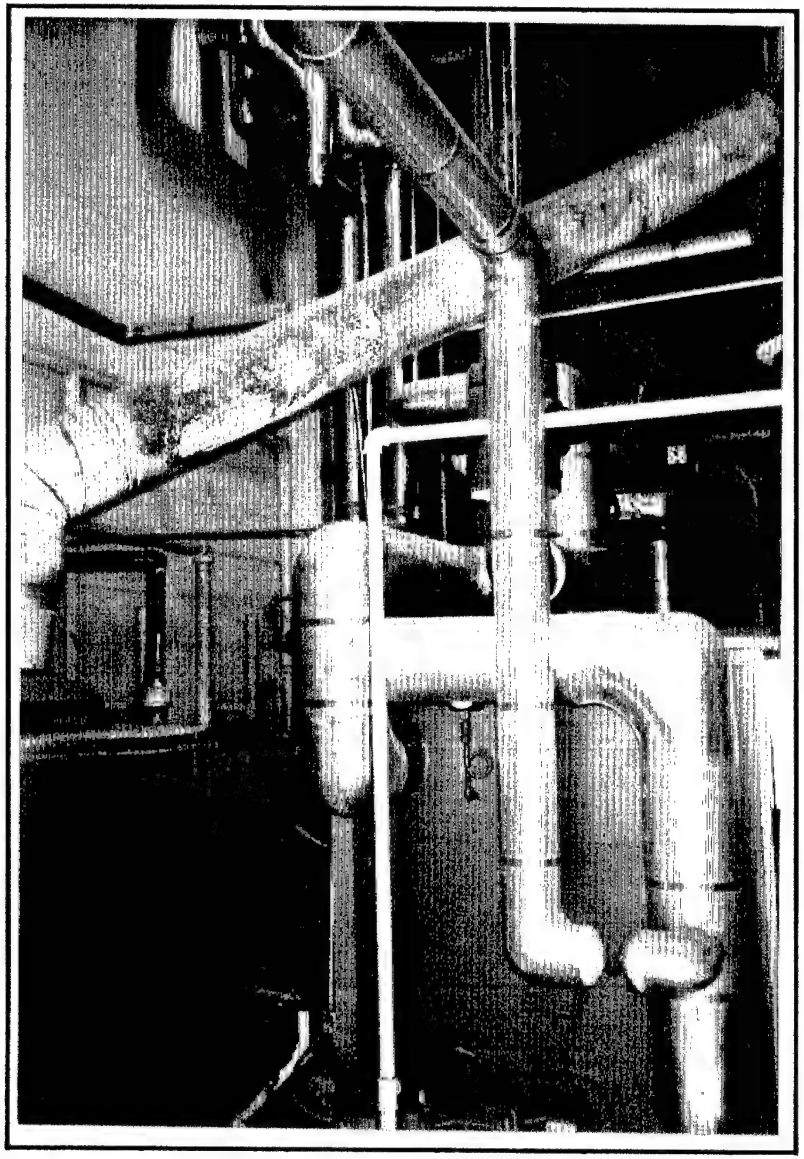


Photo 31: Boiler Room

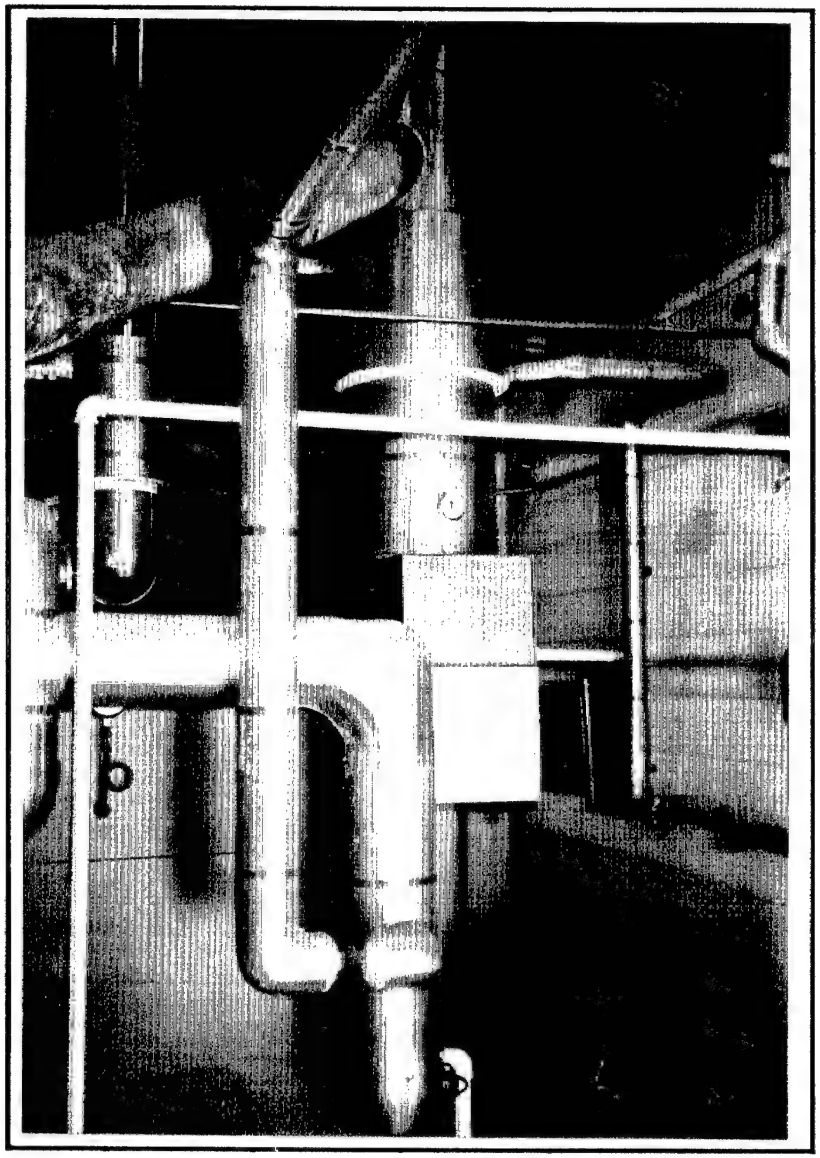


Photo 32: Boiler Room

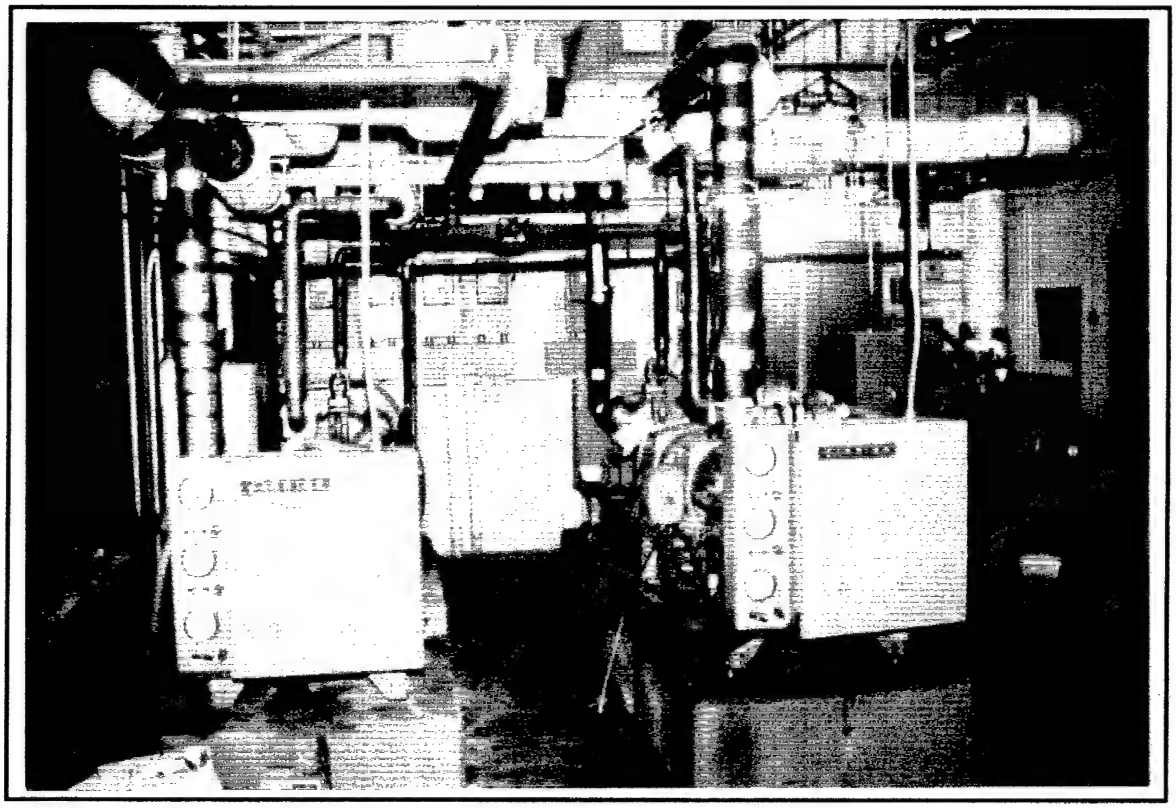


Photo 33: Compressor Banks in Mechanical Room

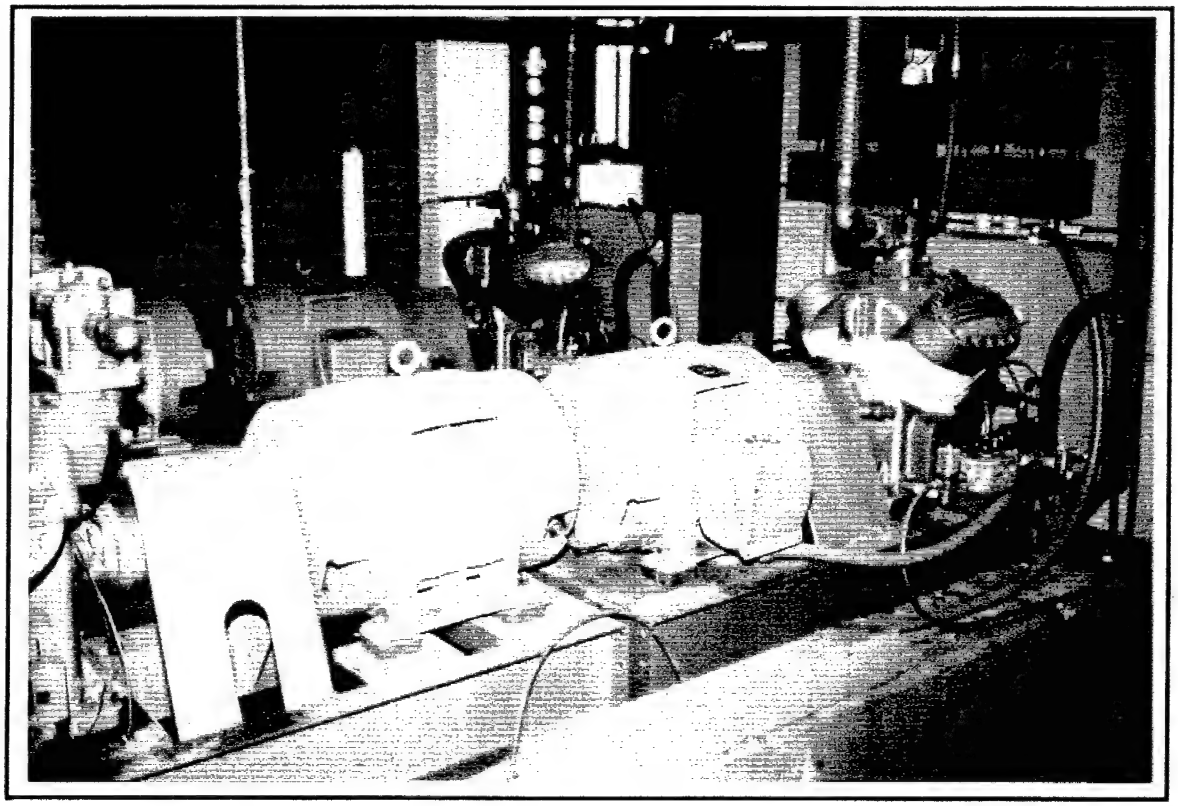


Photo 34: Compressor Banks in Mechanical Room

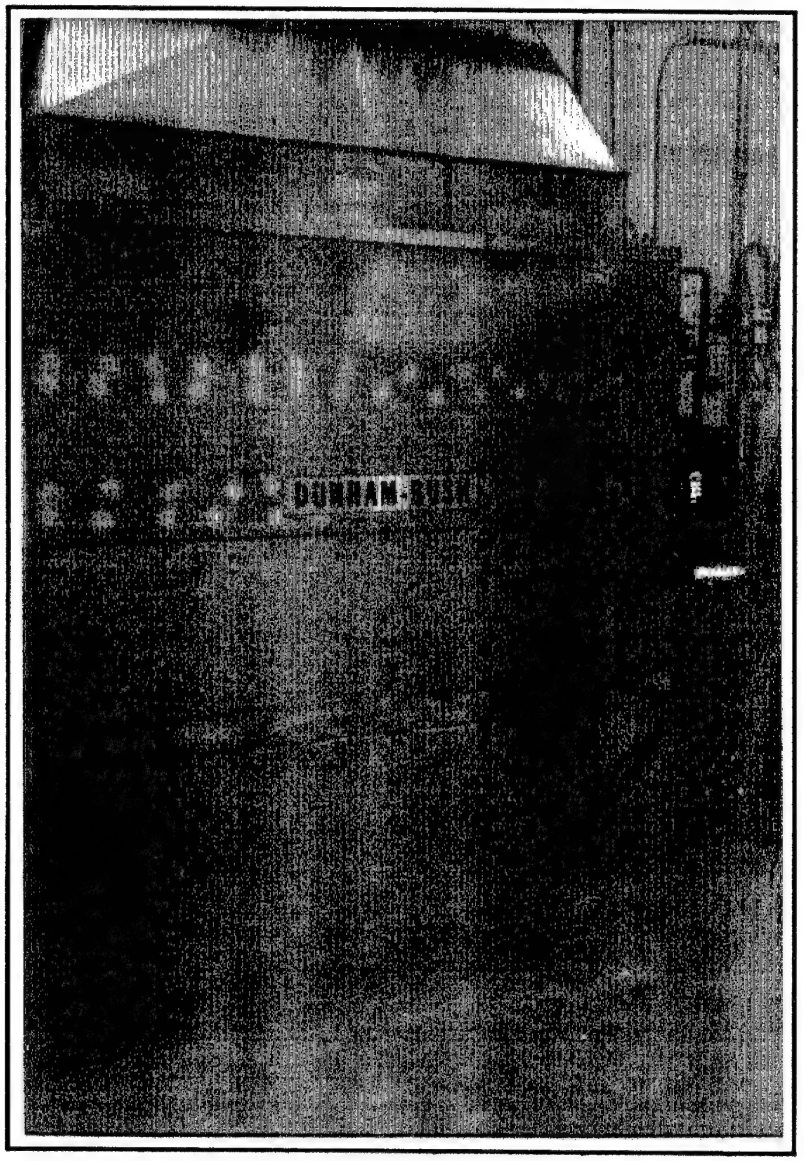


Photo 35: Water-cooled Condenser

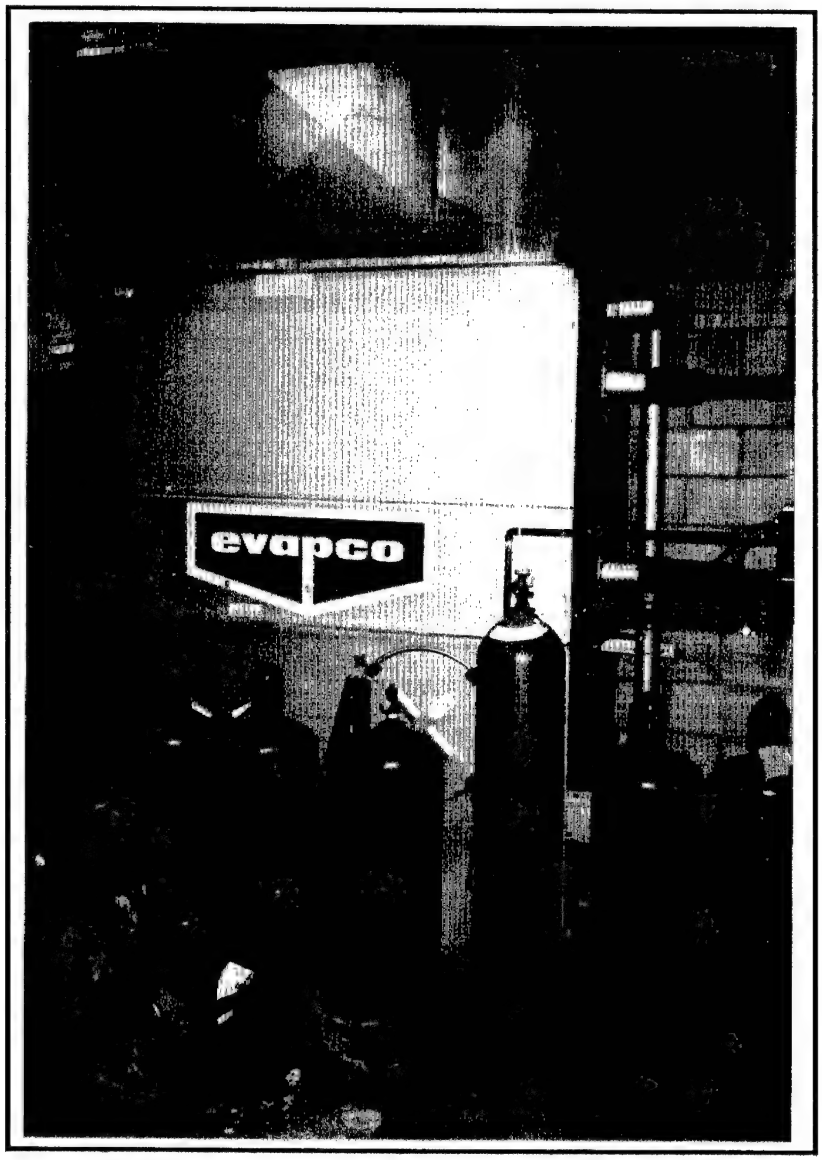


Photo 36: Water-cooled Condenser and Refrigerant Storage

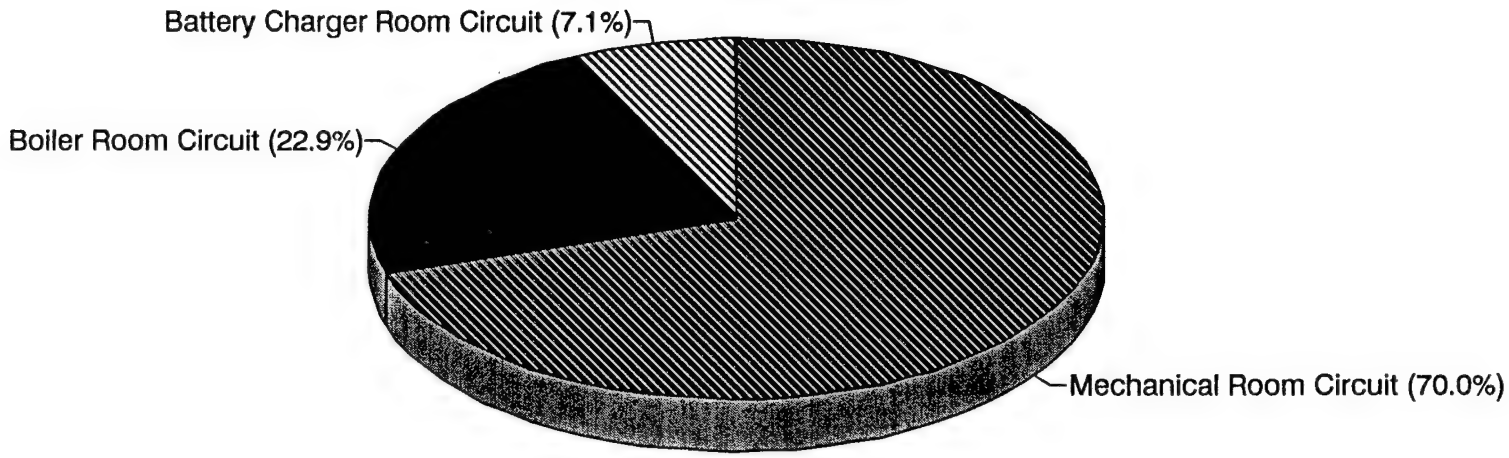
Ft. Campbell
Cold Storage Facility
Energy Study

APPENDIX 2

COLD STORAGE FACILITYENERGY COST AND USAGE DEVELOPMENT AND BACKUP DATA

January 1993

FORT CAMPBELL COLD STORAGE FACILITY
DAILY AVERAGE ENERGY USAGE
(Sept./Oct. 1992)



Room	Average Daily Energy Use (Sept/Oct 1992) (KWH)							Average Daily	Projected Monthly	Projected Yearly
	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday			
Mechanical Room Circuit	2,020.0	1,990.5	2,068.5	2,070.5	1,892.5	2,140.0	2,095.0	2,039.6	62,038	744,454
Boiler Room Circuit	591.7	596.7	691.5	719.0	716.5	707.5	645.0	666.8	20,282	243,382
Battery Charger Room Circuit	218.0	195.5	216.5	186.0	215.0	228.5	182.0	205.9	6,263	75,154
TOTAL	2,829.7	2,782.7	2,976.5	2,975.5	2,824.0	3,076.0	2,922.0	2,912.3	88,583	1,062,990

Room	Highest Daily Demand (Sept/Oct 1992) (KW)							Average Daily
	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	**Friday**	
Mechanical Room Circuit	90.0	89.0	118.0	100.0	111.0	108.0	**119.0**	105.0
Boiler Room Circuit	33.0	33.0	37.0	37.0	37.0	36.0	**37.0**	35.7
Battery Charger Room Circuit	10.0	10.0	11.0	11.0	12.0	15.0	**11.0**	11.4
TOTAL	133.0	132.0	166.0	148.0	160.0	159.0	**167.0**	152.1

Room	Projected Monthly Energy (KWH)	Peak Demand (KW)	Time of Peak
Mechanical Room Circuit	62,038	119	13:00
Boiler Room Circuit	20,282	37	09:00-14:30
Battery Charger Room Circuit	6,263	15	14:30
TOTAL COLD STORAGE	88,583	171	

TOTAL INSTALLATION	17,047,800	39,425	15:00	9/21/92
(Sept/Oct 92 one month)		48384	15:00	8/08/91
Cold Storage Percent	0.52%	0.43%		

	Energy	Demand	Power Factor	Customer	Facilities	Total	Yearly
CSF Charges (assume all at peak)	$1,908	$2,054				$3,962	$47,541
Installation Charges	$367,209	$473,494	$1,292	$1,500	$18,360	$861,855	$10,342,260
CSF Percent	0.52%	0.43%					0.46%

Month	Date	Day	Mechanical Room		Boiler Room		Battery Charger Room	
			Energy Use (KWH)	Peak Demand (KW)	Energy Use (KWH)	Peak Demand (KW)	Energy Use (KWH)	Peak Demand (KW)
9	19	Saturday	1960	87				
9	26	Saturday	2080	90			222	10
10	3	Saturday			660	33	214	10
10	10	Saturday			664	33		
10	17	Saturday			451	25		
		AVG	2020	88.5	591.7	30.3	218	10
9	20	Sunday	1954	85				
9	27	Sunday	2027	89			219	10
10	4	Sunday			664	33	172	10
10	11	Sunday			661	33		
10	18	Sunday			464	25		
		AVG	1990.5	87	596.3	30.3	195.5	10
9	21	Monday	2106	111				
9	28	Monday	2031	118			223	11
10	5	Monday			719	37	210	10
10	12	Monday			664	33		
		AVG	2068.5	114.5	691.5	35	216.5	10.5
9	22	Tuesday	2010	100				
9	29	Tuesday	2131	98			217	11
10	6	Tuesday			723	37	155	11
10	13	Tuesday			715	36		
		AVG	2070.5	99	719	36.5	186	11
9	23	Wednesday	1874	111				
9	30	Wednesday	1911	94			217	10
10	7	Wednesday			722	36	213	12
2	14	Wednesday			711	37		
		AVG	1892.5	102.5	716.5	36.5	215	11
9	24	Thursday	2157	100				
10	1	Thursday	2123	108			234	14
10	8	Thursday			707	36	223	12
10	15	Thursday			708	35		
		AVG	2140	104	707.5	35.5	228.5	13
9	18	Friday	2099	106				
9	25	Friday	2091	119				
10	2	Friday					182	11
10	9	Friday			706	36		
10	16	Friday			584	37		
		AVG	2095	112.5	645	36.5	182	11

TENNESSEE VALLEY AUTHORITY

DIRECT SERVICE POWER RATE—SCHEDULE DSD
(May 1992)

Availability

This rate shall apply to the firm electric power requirements of a customer that takes service directly from TVA and that has a contract demand of greater than 25,000 kW.

Base Charges

Customer Charge:	$1,500 per delivery point per month
Demand Charge:	$12.01 per kW of billing demand per month, plus an additional
	$12.01 per kW per month for each kW, if any, of the amount by which the customer's billing demand exceeds its contract demand
Energy Charge:	2.154¢ per kWh per month

Adjustment

The base demand and energy charges shall be increased or decreased in accordance with the current Adjustment Addendum published by TVA. (In addition, such charges shall be increased or decreased to correspond to increases or decreases determined by TVA in the value of the hydro-generation benefit allocated to residential consumers.) Facilities rental charges and reactive demand charges may also be increased or decreased by TVA, effective with the effective date of any such Adjustment Addendum, to reflect changes in the cost of providing for delivery at voltage levels below 161 kV and of providing reactive power, respectively.

Facilities Rental Charge

There shall be no facilities rental charge under this rate schedule for delivery at bulk transmission voltage levels of 161 kV or higher. For delivery at less than 161 kV, there shall be added to the customer's bill a facilities rental charge. This charge shall be 36¢ per kW per month except for delivery at voltages below 46 kV, in which case the charge shall be 93¢ per kW per month for the first 10,000 kW and 73¢ per kW per month for the excess over 10,000 kW. Such charge shall be applied to the higher of (1) the highest billing demand established during the latest 12-consecutive-month period and (2) the customer's currently effective contract demand and shall be in addition to all other charges under this rate schedule, including minimum bill charges.

Reactive Demand Charges

If the reactive demand (in kVAR) is lagging during the 30-consecutive-minute period beginning or ending on a clock hour of the month in which the customer's highest metered demand occurs, there shall be added to the customer's bill a reactive charge of 78¢ per kVAR of the amount, if any, by which the reactive demand exceeds 33 percent of such metered demand. If the reactive demand (in kVAR) is leading during the 30-consecutive-minute period beginning or ending on a clock hour of the month in which the customer's lowest metered demand (excluding any metered demands which are less than 25 percent of the highest metered demand) occurs, there shall be added to the customer's bill a reactive charge of 33¢ per kVAR of the amount of reactive demand. Such charges shall be in addition to all other charges under this rate schedule, including minimum bill charges.

Determination of Demand

The metered demand for any month shall be the highest average during any 30-consecutive-minute period beginning or ending on a clock hour of the month of the load metered in kW, and such amount shall be used as the billing demand, except that the billing demand for any month shall in no case be less than the sum of (1) 30 percent of the first 5,000 kW, (2) 40 percent of the next 20,000 kW, (3) 50 percent of the next 25,000 kW, (4) 60 percent of the next 50,000 kW, (5) 70 percent of the next 100,000 kW, (6) 80 percent of the next 150,000 kW, and (7) 85 percent of all kW in excess of 350,000 kW of the higher of the currently effective contract demand and the highest billing demand established during the preceding 12 months.

Minimum Bill

The monthly bill under this rate schedule, excluding any facilities rental charges and any reactive charges, shall not be less than the sum of (1) the base customer charge, (2) the base demand charge, as adjusted (but excluding the additional portion thereof applicable to excess of billing demand over contract demand) applied to the customer's billing demand, and (3) the base energy charge, as adjusted, applied to the customer's energy takings.

Single-Point Delivery

The charges under this rate schedule are based upon the supply of service through a single delivery and metering point, and at a single voltage. If service is supplied to the same customer through more than one point of delivery or at different voltages, the supply of service at each delivery and metering point and at each different voltage shall be separately metered and billed.

E05.921016 005

TO : F. Gregory Daniels Jr., Senior Industrial Representative, SP 5D-C

FROM : J. William Brooks III, Manager of Power Billing Analysis, MR 5A-C

DATE : October 13, 1992

SUBJECT : BILLING - DEPT. OF THE ARMY, FT. CAMPBELL, KY (EDGOTEN, KY SUB) FOR SERVICE TO 24:00 CST, October 10, 1992

Contract Demands

Firm Power		51,000 kW
Contract Voltage		69 kV
Highest established 12 month demand:	(08/08/91 15:00)	48,384 kW

Total Energy:

Total metered energy:
M-8740 (6,495.40 - 6,089.50) x 42000 = 17,047,800 kWh

Maximum Measured Demand:

(09/21/92 15:00)	39,425 kW	14,666 kVAR
0.33 x Maximum kW demand (including losses)	13,010 kW	
Excess lagging reactive at maximum kW		1,656 kVAR

Minimum measured Demand (including losses) in excess of 0.25 x Maximum demand (including losses):

(10/10/92 04:30)	14,629 kW	2,873 kVAR
0.25 x Maximum kW demand (including losses)	9,856 kW	
Leading reactive at minimum kW		0 kVAR

Ratchet Demand Provision: (basis = 51,000 kW)

0.30 x	5,000	kW =	1,500 kW
0.40 x	20,000	kW =	8,000 kW
0.50 x	25,000	kW =	12,500 kW
0.60 x	1,000	kW =	600 kW
		Total:	22,600 kW

Recommended billing demand	39,425 kW
Firm demand	39,425 kW
Excess billing demand	0 kW

2

F. Gregory Daniels Jr.

Billing - DEPT. OF THE ARMY, FT. CAMPBELL, KY (EDGOTEN, KY SUB)
FOR SERVICE TO 24:00 CST, October 10, 1992

Summary of Billing

Monthly Minimum Bill:

Demand:	39,425 kW	x	$12.01 =	$473,494.25
Energy:	17,047,800 kWh	x	$0.02154 =	$367,209.61
Customer Charge:				$1,500.00
Monthly Minimum Total:				$842,203.86

Normal Power Charges:

Firm Demand:	39,425 kW	x	$12.01 =	$473,494.25
Excess Demand:	0 kW	x	$12.01 =	$0.00
Excess Lagging Reactive:	1,656 kVAR	x	$0.78 =	$1,291.68
Leading Reactive:	0 kVAR	x	$0.33 =	$0.00
Energy:	17,047,800 kWh	x	$0.02154 =	$367,209.61
Customer Charge:				$1,500.00
Total Power Charges:				$843,495.54
Facilities Charges:	51,000 kW	x	$0.36 =	$18,360.00

TOTAL BILLING: $861,855.54

Prepared by: [signature] 10/13/92

Certified by: [signature] 10/13/92

CG:CP:RP:PBA
cc: RIMS, MR 2F-C

Fort Campbell Energy Demand and Cost

Month	Billing Demand Date	Time	Billing Demand	TVA Total KWH	Demand Cost	Total Cost	Demand (% of Billing)
Oct 91	9/12	1600	46,381	18,397,680	$557,036	$974,187	57.2%
Nov	11/5	830	33,491	16,205,700	$402,227	$771,158	52.2%
Dec	12/4	830	35,570	16,527,420	$427,196	$803,056	53.2%
Jan	12/19	830	35,494	17,603,040	$426,283	$825,312	51.7%
Feb	1/16	830	38,254	19,409,460	$458,628	$896,568	51.2%
Mar	2/26	1100	33,831	15,884,400	$406,310	$768,320	52.9%
Apr	3/11	830	34,700	17,707,200	$416,747	$818,020	50.9%
May	4/24	1130	30,278	15,708,000	$363,639	$721,849	50.4%
Jun	6/9	1300	36,326	17,938,200	$436,275	$842,726	51.8%
Jul	7/9	1500	45,171	21,096,600	$542,504	$1,020,077	53.2%
Aug	7/13	1500	45,927	23,818,200	$551,583	$1,087,909	50.7%
Sep	8/26	1600	43,697	21,319,200	$524,801	$1,006,546	52.1%
Oct 92	9/21	1500	39,425	17,047,800	$473,494	$864,856	54.7%
CSF		1300	167	(est.) 88,853			
			FY 92 tota	221,615,100	$5,513,229	$10,535,728	52.3%
					Cost/KWH	$0.0475	
					Cost/MBTU	$13.929	

source: Ft. Campbell DEH

TVA AND PENNYRILE CONSUMPTION AND COST (FY92):

	PENNYRILE TOTAL KWH	PENNYRILE TOTAL COST	TVA TOTAL KWH	TVA RATE (KWH)	TVA TOTAL COST (KWH)	TVA TOTAL DEMAND (KW)	TVA RATE (KW)	TVA TOTAL DEMAND COST	TVA CUSTOMER CHARGE	TVA FACILITIES RENTAL CHARGE	TVA REACTIVE POWER CHARGE	TVA TOTAL TVA CHARGE	TVA CREDIT
OCT	964,289	$59,997.47	18,397,680	0.02154	$396,286.03	46381	$12.01	$557,035.81	$1,500.00	$18,360.00	$1,004.64	$974,186.48	
NOV	1,083,906	$66,717.51	16,205,700	0.02154	$349,070.78	33491	$12.01	$402,226.91	$1,500.00	$18,360.00	$0.00	$771,157.69	
DEC	953,877	$59,381.32	16,527,420	0.02154	$356,000.63	35570	$12.01	$427,195.70	$1,500.00	$18,360.00	$0.00	$803,056.33	
JAN	1,091,659	$67,246.02	17,603,040	0.02154	$379,169.48	35494	$12.01	$426,282.94	$1,500.00	$18,360.00	$0.00	$825,312.42	
FEB	1,020,092	$63,140.48	19,409,460	0.02154	$418,079.77	38254	$12.01	$458,627.77	$1,500.00	$18,360.00	$0.00	$896,567.54	
MAR	918,077	$57,339.69	15,884,400	0.02154	$342,149.98	33831	$12.01	$406,310.31	$1,500.00	$18,360.00	$0.00	$768,320.29	
APR	927,220	$57,855.36	17,707,200	0.02154	$381,413.09	34700	$12.01	$416,747.00	$1,500.00	$18,360.00	$0.00	$818,020.09	
MAY	818,373	$54,258.57	15,708,000	0.02154	$338,350.32	30278	$12.01	$363,638.78	$1,500.00	$18,360.00	$0.00	$721,849.10	
JUN	949,002	$61,926.16	17,938,200	0.02154	$386,388.83	36326	$12.01	$436,275.26	$1,500.00	$18,360.00	$202.02	$842,726.11	
JUL	854,185	$56,379.23	21,096,600	0.02154	$454,420.76	45171	$12.01	$542,503.71	$1,500.00	$18,360.00	$3,292.38	$1,020,076.85	
AUG	894,206	$58,726.71	23,818,200	0.02154	$513,044.03	45927	$12.01	$551,583.27	$1,500.00	$18,360.00	$3,421.86	$1,087,909.16	
SEP	913,064	$59,945.10	21,319,200	0.02154	$459,215.57	43697	$12.01	$524,800.97	$1,500.00	$18,360.00	$2,669.16	$1,006,545.70	
	11,387,950	$722,913.62	221,615,100		$4,773,589.25	459120		$5,513,228.43	$18,000.00	$220,320.00	$10,590.06	$10,535,727.74	$0.00

TOTAL FY92 KWH 233,003,050

TOTAL FY92 COST $11,258,641.36

CLARKSVILLE GAS FY92	KCF	COST
OCT	83,695	$284,302.95
NOV	162,705	$530,671.93
DEC	205,340	$663,616.39
JAN	232,434	$748,100.90
FEB	179,711	$583,700.04
MAR	162,929	$531,370.41
APR	95,506	$321,132.01
MAY	68,337	$236,413.63
JUN	72,678	$249,949.74
JUL	77,701	$265,612.45
AUG	69,605	$263,736.25
SEP	54,771	$217,480.87
	1,465,412	$4,896,087.57
X	10.18	
	14,917,894 THERMS	

Industrial Energy Services

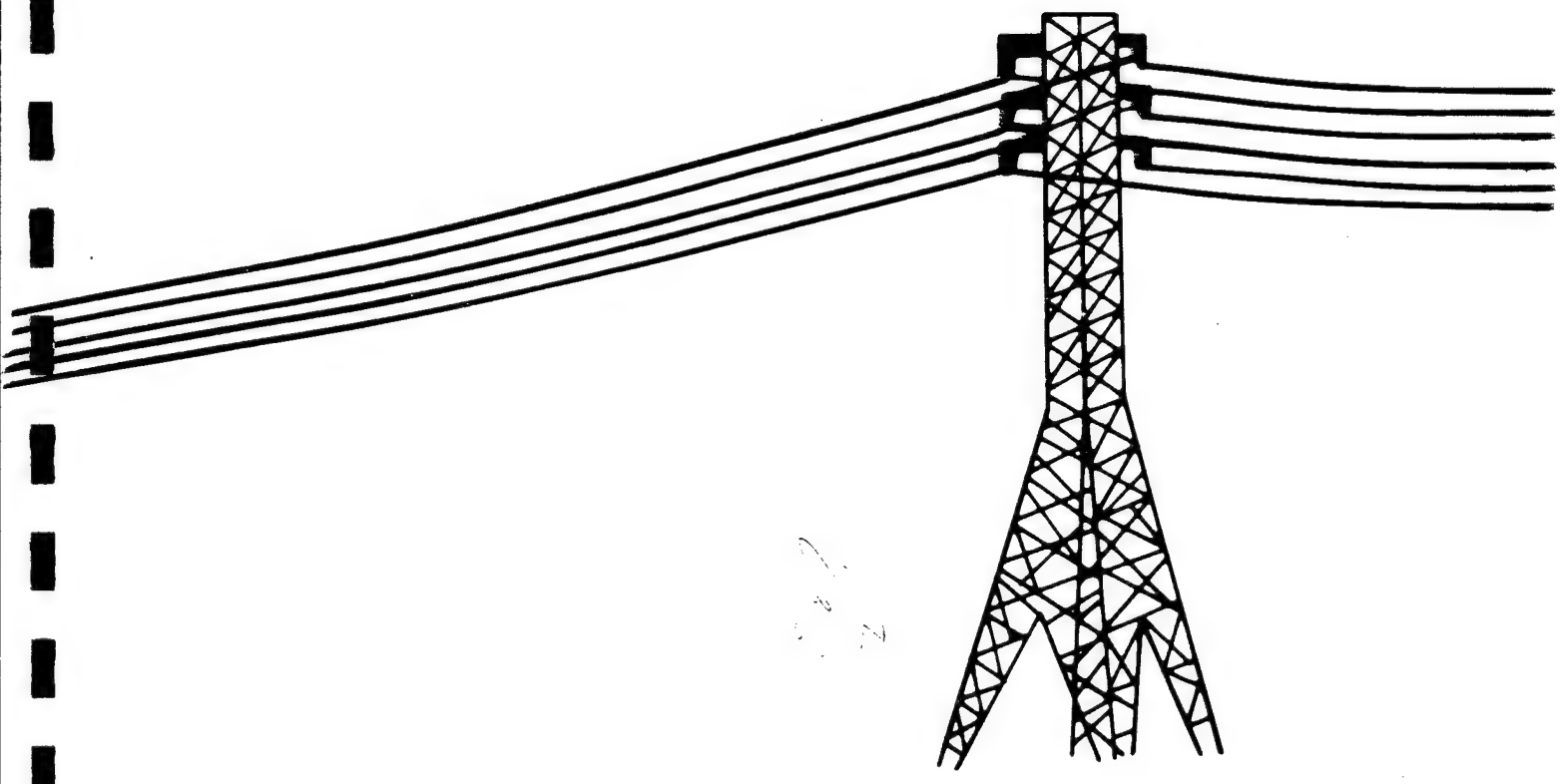
Tennessee Valley Authority and
Distributors of TVA Electric Power

Energy Services
for Business and Industry

DEMAND STUDY
FOR
COLD STORAGE FACILITY

CHERYL M. LEMON
OCTOBER 23, 1992

TVA/HOPKINSVILLE OFFICE
FORT CAMPBELL, KENTUCKY



Tennessee Valley Authority, 700 Hammond Plaza, Hopkinsville, Kentucky 42240

October 23, 1992

Ms. Rebecca Corry, Project Manager
Ogden Environment and Energy Services
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Kentucky 40299

Dear Ms. Corry:

RE: COLD STORAGE FACILITY, FORT CAMPBELL OGDEN PROJECT NUMBER 0-4627-0070-0000

At your request, William Peacher and I installed demand recording meter from September 18, 1992 to October 19, 1992. This is a summary of the data recorded during this period.

*The Mechanical Room was metered from September 18, 1992 to October 1, 1992. The highest recorded data was on September 25, 1992 at 1300.

119-kW
149-kVA
80%-Power Factor

The lowest recorded data was on September 28, 1992.

47-kW
51-kVA
92%-Power Factor

*The Battery Charger Room was metered from September 25, 1992 to October 8, 1992. The highest recorded data was on October 1, 1992 at 1530.

14-kW
17-kVA
84%-Power Factor

The lowest recorded demand was 7-kW, 7-kVA with 99% Power Factor. This was recorded on several different times during the metering period.

*The Boiler Room was metered from October 2, 1992 to October 19, 1992. The highest recorded demand was on October 2, 1992.

37-kW
40-kVA
92%-Power Factor

The lowest recorded demand was 18-kW and 21-kVA with a 84 percent power factor. This was recorded on several different times..

Enclosed are copies of the daily load profiles. If you have any questions, please contact me at 502-886-6400.

Sincerely,

Cheryl M. Lemon
Energy Services Technician

Enclosures
cc: Arlin E. Wright, Supervisor Industrial Engineer
DEH Systems & Projects
16th & Ohio
Fort Campbell, Kentucky 42223-5060

1992 YEAR
Sept. MONTH
18 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	80	114	70	++++++++++++++++++++++
1:00	81	116	70	++++++++++++++++++++++
1:30	80	114	70	++++++++++++++++++++++
2:00	83	117	71	+++++++++++++++++++++++
2:30	81	116	70	++++++++++++++++++++++
3:00	77	112	69	+++++++++++++++++++++
3:30	82	117	70	++++++++++++++++++++++
4:00	78	111	70	++++++++++++++++++++
4:30	82	114	72	++++++++++++++++++++++
5:00	85	118	72	+++++++++++++++++++++++
5:30	80	114	70	++++++++++++++++++++++
6:00	80	113	71	++++++++++++++++++++++
6:30	86	118	73	+++++++++++++++++++++++
7:00	83	117	71	+++++++++++++++++++++++
7:30	85	118	72	+++++++++++++++++++++++
8:00	93	124	75	++++++++++++++++++++++++
8:30	99	129	77	+++++++++++++++++++++++++
9:00	95	123	77	+++++++++++++++++++++++++
9:30	90	122	74	++++++++++++++++++++++++
10:00	100	128	78	+++++++++++++++++++++++++
10:30	94	124	76	++++++++++++++++++++++++
11:00	100	130	77	+++++++++++++++++++++++++
11:30	95	125	76	++++++++++++++++++++++++
12:00	100	130	77	+++++++++++++++++++++++++
12:30	106	134	79	+++++++++++++++++++++++++++
13:00	102	132	77	+++++++++++++++++++++++++
13:30	93	124	75	++++++++++++++++++++++++
14:00	98	129	76	++++++++++++++++++++++++
14:30	94	125	75	++++++++++++++++++++++++
15:00	95	127	75	++++++++++++++++++++++++
15:30	99	130	76	++++++++++++++++++++++++
16:00	90	123	73	+++++++++++++++++++++++
16:30	86	119	72	++++++++++++++++++++++
17:00	79	113	70	++++++++++++++++++++
17:30	86	121	71	+++++++++++++++++++++
18:00	82	117	70	++++++++++++++++++++
18:30	84	118	71	+++++++++++++++++++++
19:00	82	117	70	++++++++++++++++++++
19:30	80	114	70	++++++++++++++++++++
20:00	87	121	72	+++++++++++++++++++++
20:30	81	114	71	+++++++++++++++++++++
21:00	85	118	72	+++++++++++++++++++++
21:30	82	115	71	+++++++++++++++++++++
22:00	86	118	73	+++++++++++++++++++++
22:30	87	116	75	+++++++++++++++++++++
23:00	81	113	72	+++++++++++++++++++++
23:30	85	120	71	+++++++++++++++++++++
24:00	79	114	69	+++++++++++++++++++++

2099 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
19 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	81	116	70	++++++++++++++++++++++
1:00	78	113	69	++++++++++++++++++++++
1:30	81	116	70	++++++++++++++++++++++
2:00	79	114	69	++++++++++++++++++++++
2:30	79	113	70	++++++++++++++++++++++
3:00	79	114	69	++++++++++++++++++++++
3:30	81	116	70	++++++++++++++++++++++
4:00	81	116	70	++++++++++++++++++++++
4:30	87	119	73	+++++++++++++++++++++++++
5:00	80	114	70	++++++++++++++++++++++
5:30	79	114	69	++++++++++++++++++++++
6:00	80	114	70	++++++++++++++++++++++
6:30	80	114	70	++++++++++++++++++++++
7:00	83	119	70	+++++++++++++++++++++++
7:30	78	113	69	++++++++++++++++++++++
8:00	82	115	71	++++++++++++++++++++++
8:30	78	111	70	++++++++++++++++++++++
9:00	80	111	72	++++++++++++++++++++++
9:30	78	111	70	++++++++++++++++++++++
10:00	84	117	72	+++++++++++++++++++++++
10:30	82	114	72	++++++++++++++++++++++
11:00	82	114	72	++++++++++++++++++++++
11:30	81	116	70	++++++++++++++++++++++
12:00	81	116	70	++++++++++++++++++++++
12:30	83	115	72	+++++++++++++++++++++++
13:00	80	114	70	++++++++++++++++++++++
13:30	81	116	70	++++++++++++++++++++++
14:00	80	114	70	++++++++++++++++++++++
14:30	86	119	72	+++++++++++++++++++++++
15:00	82	115	71	++++++++++++++++++++++
15:30	86	119	72	+++++++++++++++++++++++
16:00	80	114	70	++++++++++++++++++++++
16:30	81	114	71	++++++++++++++++++++++
17:00	81	113	72	++++++++++++++++++++++
17:30	82	115	71	++++++++++++++++++++++
18:00	83	119	70	+++++++++++++++++++++++
18:30	83	119	70	+++++++++++++++++++++++
19:00	81	116	70	++++++++++++++++++++++
19:30	84	118	71	+++++++++++++++++++++++
20:00	83	117	71	+++++++++++++++++++++++
20:30	83	117	71	+++++++++++++++++++++++
21:00	87	121	72	+++++++++++++++++++++++++
21:30	82	117	70	++++++++++++++++++++++
22:00	86	119	72	+++++++++++++++++++++++
22:30	85	116	73	+++++++++++++++++++++++
23:00	83	115	72	+++++++++++++++++++++++
23:30	82	115	71	++++++++++++++++++++++
24:00	82	115	71	++++++++++++++++++++++

1960 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
20 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	81	116	70	++++++++++++++++++++++
1:00	79	114	69	++++++++++++++++++++++
1:30	82	117	70	++++++++++++++++++++++
2:00	77	112	69	++++++++++++++++++++
2:30	82	117	70	++++++++++++++++++++++
3:00	79	113	70	++++++++++++++++++++++
3:30	82	117	70	++++++++++++++++++++++
4:00	83	117	71	+++++++++++++++++++++++
4:30	81	114	71	++++++++++++++++++++++
5:00	85	118	72	+++++++++++++++++++++++
5:30	78	113	69	++++++++++++++++++++
6:00	82	115	71	++++++++++++++++++++++
6:30	81	116	70	++++++++++++++++++++++
7:00	83	117	71	+++++++++++++++++++++++
7:30	79	113	70	++++++++++++++++++++++
8:00	79	113	70	++++++++++++++++++++++
8:30	81	114	71	++++++++++++++++++++++
9:00	75	107	70	++++++++++++++++++++
9:30	82	115	71	++++++++++++++++++++++
10:00	84	115	73	+++++++++++++++++++++++
10:30	84	115	73	+++++++++++++++++++++++
11:00	83	115	72	+++++++++++++++++++++++
11:30	82	115	71	++++++++++++++++++++++
12:00	80	114	70	++++++++++++++++++++++
12:30	81	114	71	++++++++++++++++++++++
13:00	83	117	71	+++++++++++++++++++++++
13:30	78	111	70	++++++++++++++++++++
14:00	83	117	71	+++++++++++++++++++++++
14:30	82	115	71	++++++++++++++++++++++
15:00	84	117	72	+++++++++++++++++++++++
15:30	80	114	70	++++++++++++++++++++++
16:00	86	119	72	+++++++++++++++++++++++
16:30	82	114	72	++++++++++++++++++++++
17:00	77	110	70	++++++++++++++++++++
17:30	83	117	71	+++++++++++++++++++++++
18:00	80	114	70	++++++++++++++++++++++
18:30	84	118	71	+++++++++++++++++++++++
19:00	78	113	69	++++++++++++++++++++
19:30	81	114	71	++++++++++++++++++++++
20:00	82	115	71	++++++++++++++++++++++
20:30	81	114	71	++++++++++++++++++++++
21:00	83	115	72	+++++++++++++++++++++++
21:30	82	117	70	++++++++++++++++++++++
22:00	85	118	72	+++++++++++++++++++++++
22:30	85	116	73	+++++++++++++++++++++++
23:00	83	115	72	+++++++++++++++++++++++
23:30	81	116	70	++++++++++++++++++++++
24:00	79	114	69	++++++++++++++++++++++

1954 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
21 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	82	117	70	++++++++++++++++++++++++
1:00	80	116	69	++++++++++++++++++++++++
1:30	81	116	70	++++++++++++++++++++++++
2:00	79	114	69	++++++++++++++++++++++++
2:30	83	119	70	++++++++++++++++++++++++
3:00	81	116	70	++++++++++++++++++++++++
3:30	78	113	69	++++++++++++++++++++++++
4:00	82	115	71	++++++++++++++++++++++++
4:30	81	114	71	++++++++++++++++++++++++
5:00	82	117	70	++++++++++++++++++++++++
5:30	82	117	70	++++++++++++++++++++++++
6:00	80	114	70	++++++++++++++++++++++++
6:30	84	118	71	++++++++++++++++++++++++
7:00	81	116	70	++++++++++++++++++++++++
7:30	91	123	74	++++++++++++++++++++++++
8:00	96	126	76	++++++++++++++++++++++++
8:30	93	124	75	++++++++++++++++++++++++
9:00	92	121	76	++++++++++++++++++++++++
9:30	92	124	74	++++++++++++++++++++++++
10:00	96	126	76	++++++++++++++++++++++++
10:30	95	125	76	++++++++++++++++++++++++
11:00	95	127	75	++++++++++++++++++++++++
11:30	93	124	75	++++++++++++++++++++++++
12:00	92	124	74	++++++++++++++++++++++++
12:30	98	129	76	++++++++++++++++++++++++
13:00	95	127	75	++++++++++++++++++++++++
13:30	95	127	75	++++++++++++++++++++++++
14:00	104	135	77	++++++++++++++++++++++++
14:30	111	141	79	++++++++++++++++++++++++
15:00	100	132	76	++++++++++++++++++++++++
15:30	99	132	75	++++++++++++++++++++++++
16:00	91	123	74	++++++++++++++++++++++++
16:30	86	119	72	++++++++++++++++++++++++
17:00	85	118	72	++++++++++++++++++++++++
17:30	88	124	71	++++++++++++++++++++++++
18:00	85	120	71	++++++++++++++++++++++++
18:30	83	119	70	++++++++++++++++++++++++
19:00	82	117	70	++++++++++++++++++++++++
19:30	80	114	70	++++++++++++++++++++++++
20:00	83	117	71	++++++++++++++++++++++++
20:30	84	118	71	++++++++++++++++++++++++
21:00	86	119	72	++++++++++++++++++++++++
21:30	84	118	71	++++++++++++++++++++++++
22:00	84	118	71	++++++++++++++++++++++++
22:30	88	119	74	++++++++++++++++++++++++
23:00	84	117	72	++++++++++++++++++++++++
23:30	85	120	71	++++++++++++++++++++++++
24:00	81	116	70	++++++++++++++++++++++++

2106 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
22 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	80	114	70	++++++++++++++++++++++
1:00	79	114	69	++++++++++++++++++++++
1:30	80	116	69	++++++++++++++++++++++
2:00	79	113	70	++++++++++++++++++++++
2:30	79	114	69	++++++++++++++++++++++
3:00	79	114	69	++++++++++++++++++++++
3:30	80	116	69	++++++++++++++++++++++
4:00	84	118	71	+++++++++++++++++++++++
4:30	86	118	73	+++++++++++++++++++++++
5:00	85	118	72	+++++++++++++++++++++++
5:30	83	117	71	+++++++++++++++++++++++
6:00	84	118	71	+++++++++++++++++++++++
6:30	83	117	71	+++++++++++++++++++++++
7:00	84	118	71	+++++++++++++++++++++++
7:30	89	122	73	++++++++++++++++++++++++
8:00	100	132	76	+++++++++++++++++++++++++++
8:30	96	126	76	++++++++++++++++++++++++++
9:00	86	116	74	+++++++++++++++++++++++
9:30	91	123	74	++++++++++++++++++++++++
10:00	91	121	75	+++++++++++++++++++++++++
10:30	93	122	76	+++++++++++++++++++++++++
11:00	92	123	75	+++++++++++++++++++++++++
11:30	89	122	73	++++++++++++++++++++++++
12:00	92	124	74	+++++++++++++++++++++++++
12:30	92	123	75	+++++++++++++++++++++++++
13:00	91	123	74	+++++++++++++++++++++++++
13:30	90	123	73	+++++++++++++++++++++++++
14:00	87	121	72	++++++++++++++++++++++++
14:30	89	122	73	++++++++++++++++++++++++
15:00	91	125	73	++++++++++++++++++++++++
15:30	81	117	69	++++++++++++++++++++++
16:00	80	116	69	++++++++++++++++++++++
16:30	79	113	70	++++++++++++++++++++++
17:00	77	110	70	++++++++++++++++++++
17:30	81	117	69	++++++++++++++++++++++
18:00	81	116	70	++++++++++++++++++++++
18:30	80	114	70	++++++++++++++++++++++
19:00	79	113	70	++++++++++++++++++++++
19:30	78	111	70	++++++++++++++++++++
20:00	81	114	71	+++++++++++++++++++++++
20:30	81	114	71	+++++++++++++++++++++++
21:00	79	113	70	++++++++++++++++++++++
21:30	78	113	69	++++++++++++++++++++
22:00	79	113	70	++++++++++++++++++++++
22:30	82	112	73	++++++++++++++++++++++
23:00	79	100	79	++++++++++++++++++++++
23:30	71	90	79	++++++++++++++++++
24:00	69	87	79	++++++++++++++++++

69
2010 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
23 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	79	113	70	++++++++++++++++++++++++
1:00	79	114	69	++++++++++++++++++++++++
1:30	80	114	70	++++++++++++++++++++++++
2:00	75	109	69	+++++++++++++++++++++++
2:30	76	110	69	+++++++++++++++++++++++
3:00	76	110	69	+++++++++++++++++++++++
3:30	75	110	68	+++++++++++++++++++++++
4:00	76	110	69	+++++++++++++++++++++++
4:30	79	111	71	++++++++++++++++++++++++
5:00	78	113	69	+++++++++++++++++++++++
5:30	77	112	69	+++++++++++++++++++++++
6:00	80	114	70	++++++++++++++++++++++++
6:30	80	114	70	++++++++++++++++++++++++
7:00	80	114	70	++++++++++++++++++++++++
7:30	86	119	72	+++++++++++++++++++++++++
8:00	87	119	73	++++++++++++++++++++++++++
8:30	82	112	73	+++++++++++++++++++++++++
9:00	47	53	89	++++++++++++
9:30	47	52	90	++++++++++++
10:00	53	58	92	+++++++++++++++
10:30	53	58	92	+++++++++++++++
11:00	52	57	91	++++++++++++++
11:30	49	56	88	++++++++++++++
12:00	48	54	89	++++++++++++++
12:30	49	54	90	++++++++++++++
13:00	48	54	89	++++++++++++++
13:30	48	54	89	++++++++++++++
14:00	47	53	89	++++++++++++++
14:30	73	86	85	+++++++++++++++++++++
15:00	111	139	80	++++++++++++++++++++++++++++++++
15:30	107	137	78	+++++++++++++++++++++++++++++
16:00	103	136	76	++++++++++++++++++++++++++++
16:30	100	132	76	++++++++++++++++++++++++++++
17:00	92	123	75	++++++++++++++++++++++++
17:30	94	127	74	+++++++++++++++++++++++++
18:00	91	125	73	++++++++++++++++++++++++
18:30	91	125	73	++++++++++++++++++++++++
19:00	90	122	74	+++++++++++++++++++++++++
19:30	85	118	72	++++++++++++++++++++++
20:00	92	123	75	++++++++++++++++++++++++
20:30	88	119	74	+++++++++++++++++++++++
21:00	93	124	75	++++++++++++++++++++++++
21:30	91	123	74	+++++++++++++++++++++++
22:00	96	128	75	++++++++++++++++++++++++
22:30	94	124	76	++++++++++++++++++++++++
23:00	92	123	75	++++++++++++++++++++++++
23:30	94	127	74	+++++++++++++++++++++++++
24:00	85	116	73	++++++++++++++++++++++

1874 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
24 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	89	122	73	++++++++++++++++++++++++++
1:00	84	118	71	++++++++++++++++++++++++
1:30	85	118	72	++++++++++++++++++++++++
2:00	86	119	72	++++++++++++++++++++++++
2:30	82	115	71	++++++++++++++++++++++
3:00	85	118	72	++++++++++++++++++++++++
3:30	85	118	72	++++++++++++++++++++++++
4:00	82	115	71	++++++++++++++++++++++
4:30	89	120	74	++++++++++++++++++++++++++
5:00	85	116	73	++++++++++++++++++++++++
5:30	86	118	73	++++++++++++++++++++++++
6:00	84	117	72	++++++++++++++++++++++++
6:30	86	119	72	++++++++++++++++++++++++
7:00	89	122	73	++++++++++++++++++++++++++
7:30	89	122	73	++++++++++++++++++++++++++
8:00	92	124	74	+++++++++++++++++++++++++++
8:30	96	126	76	+++++++++++++++++++++++++++
9:00	94	124	76	+++++++++++++++++++++++++++
9:30	97	128	76	+++++++++++++++++++++++++++
10:00	100	128	78	++++++++++++++++++++++++++++
10:30	100	128	78	++++++++++++++++++++++++++++
11:00	100	130	77	++++++++++++++++++++++++++++
11:30	98	129	76	+++++++++++++++++++++++++++
12:00	97	128	76	+++++++++++++++++++++++++++
12:30	99	129	77	++++++++++++++++++++++++++++
13:00	99	129	77	++++++++++++++++++++++++++++
13:30	96	126	76	+++++++++++++++++++++++++++
14:00	97	128	76	+++++++++++++++++++++++++++
14:30	100	130	77	++++++++++++++++++++++++++++
15:00	97	128	76	+++++++++++++++++++++++++++
15:30	89	122	73	++++++++++++++++++++++++++
16:00	89	122	73	++++++++++++++++++++++++++
16:30	87	119	73	++++++++++++++++++++++++++
17:00	85	118	72	++++++++++++++++++++++++
17:30	87	121	72	++++++++++++++++++++++++
18:00	85	118	72	++++++++++++++++++++++++
18:30	85	118	72	++++++++++++++++++++++++
19:00	86	119	72	++++++++++++++++++++++++
19:30	85	116	73	++++++++++++++++++++++++
20:00	86	118	73	++++++++++++++++++++++++
20:30	88	121	73	++++++++++++++++++++++++++
21:00	90	122	74	+++++++++++++++++++++++++++
21:30	87	121	72	++++++++++++++++++++++++
22:00	86	119	72	++++++++++++++++++++++++
22:30	91	121	75	++++++++++++++++++++++++++
23:00	87	118	74	++++++++++++++++++++++++++
23:30	87	121	72	++++++++++++++++++++++++
24:00	85	118	72	++++++++++++++++++++++++

2157 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
25 DAY

DAILY LOAD PROFILE

Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	84	118	71	++++++++++++++++++++++
1:00	86	121	71	++++++++++++++++++++++
1:30	86	119	72	++++++++++++++++++++++
2:00	84	118	71	++++++++++++++++++++++
2:30	84	118	71	++++++++++++++++++++++
3:00	84	118	71	++++++++++++++++++++++
3:30	83	117	71	++++++++++++++++++++++
4:00	84	117	72	++++++++++++++++++++++
4:30	87	119	73	+++++++++++++++++++++++
5:00	87	119	73	+++++++++++++++++++++++
5:30	84	117	72	++++++++++++++++++++++
6:00	85	118	72	++++++++++++++++++++++
6:30	88	119	74	+++++++++++++++++++++++
7:00	86	118	73	+++++++++++++++++++++++
7:30	91	123	74	++++++++++++++++++++++++
8:00	92	123	75	++++++++++++++++++++++++
8:30	92	121	76	++++++++++++++++++++++++
9:00	91	120	76	++++++++++++++++++++++++
9:30	75	97	77	++++++++++++++++++++
10:00	72	86	84	++++++++++++++++++++
10:30	73	86	85	++++++++++++++++++++
11:00	70	83	84	++++++++++++++++++++
11:30	51	57	89	++++++++++++++++
12:00	49	54	90	++++++++++++++++
12:30	77	91	85	++++++++++++++++++++
13:00	119	149	80	++++++++++++++++++++++++++++++++++
13:30	109	138	79	+++++++++++++++++++++++++++++++++
14:00	107	137	78	++++++++++++++++++++++++++++++++
14:30	103	134	77	+++++++++++++++++++++++++++++++
15:00	98	129	76	++++++++++++++++++++++++++++
15:30	95	128	74	++++++++++++++++++++++++++++
16:00	95	128	74	++++++++++++++++++++++++++++
16:30	92	123	75	++++++++++++++++++++++++++
17:00	91	121	75	++++++++++++++++++++++++++
17:30	93	126	74	++++++++++++++++++++++++++
18:00	89	122	73	+++++++++++++++++++++++++
18:30	87	121	72	+++++++++++++++++++++++++
19:00	87	119	73	+++++++++++++++++++++++++
19:30	87	119	73	+++++++++++++++++++++++++
20:00	90	122	74	++++++++++++++++++++++++++
20:30	88	119	74	++++++++++++++++++++++++++
21:00	89	120	74	++++++++++++++++++++++++++
21:30	88	121	73	+++++++++++++++++++++++++
22:00	88	121	73	+++++++++++++++++++++++++
22:30	92	121	76	++++++++++++++++++++++++++
23:00	90	120	75	++++++++++++++++++++++++++
23:30	92	126	73	+++++++++++++++++++++++++
24:00	87	121	72	+++++++++++++++++++++++++

2091 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
26 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	87	121	72	++++++++++++++++++++++++
1:00	86	119	72	++++++++++++++++++++++++
1:30	85	118	72	++++++++++++++++++++++++
2:00	86	119	72	++++++++++++++++++++++++
2:30	85	118	72	++++++++++++++++++++++++
3:00	86	119	72	++++++++++++++++++++++++
3:30	85	118	72	++++++++++++++++++++++++
4:00	88	121	73	+++++++++++++++++++++++++
4:30	93	124	75	+++++++++++++++++++++++++++
5:00	89	122	73	+++++++++++++++++++++++++
5:30	86	119	72	++++++++++++++++++++++++
6:00	86	119	72	++++++++++++++++++++++++
6:30	87	119	73	+++++++++++++++++++++++++
7:00	87	119	73	+++++++++++++++++++++++++
7:30	86	119	72	++++++++++++++++++++++++
8:00	85	118	72	++++++++++++++++++++++++
8:30	85	116	73	+++++++++++++++++++++++++
9:00	85	115	74	++++++++++++++++++++++++++
9:30	85	118	72	++++++++++++++++++++++++
10:00	88	119	74	++++++++++++++++++++++++++
10:30	90	122	74	++++++++++++++++++++++++++
11:00	90	122	74	++++++++++++++++++++++++++
11:30	88	121	73	+++++++++++++++++++++++++
12:00	85	118	72	++++++++++++++++++++++++
12:30	87	119	73	+++++++++++++++++++++++++
13:00	87	119	73	+++++++++++++++++++++++++
13:30	87	119	73	+++++++++++++++++++++++++
14:00	86	119	72	++++++++++++++++++++++++
14:30	88	121	73	+++++++++++++++++++++++++
15:00	87	121	72	++++++++++++++++++++++++
15:30	86	119	72	++++++++++++++++++++++++
16:00	86	119	72	++++++++++++++++++++++++
16:30	85	116	73	+++++++++++++++++++++++++
17:00	84	117	72	++++++++++++++++++++++++
17:30	86	119	72	++++++++++++++++++++++++
18:00	88	121	73	+++++++++++++++++++++++++
18:30	84	117	72	++++++++++++++++++++++++
19:00	85	118	72	++++++++++++++++++++++++
19:30	84	117	72	++++++++++++++++++++++++
20:00	88	119	74	++++++++++++++++++++++++++
20:30	87	118	74	++++++++++++++++++++++++++
21:00	86	118	73	+++++++++++++++++++++++++
21:30	86	118	73	+++++++++++++++++++++++++
22:00	88	119	74	++++++++++++++++++++++++++
22:30	92	121	76	++++++++++++++++++++++++++++
23:00	87	118	74	++++++++++++++++++++++++++
23:30	88	122	72	++++++++++++++++++++++++
24:00	85	120	71	+++++++++++++++++++++++

2080 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
27 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	84	117	72	++++++++++++++++++++++++
1:00	84	117	72	++++++++++++++++++++++++
1:30	85	118	72	++++++++++++++++++++++++
2:00	84	118	71	++++++++++++++++++++++++
2:30	84	118	71	++++++++++++++++++++++++
3:00	83	117	71	++++++++++++++++++++++++
3:30	83	117	71	++++++++++++++++++++++++
4:00	82	115	71	++++++++++++++++++++++++
4:30	87	119	73	++++++++++++++++++++++++
5:00	86	119	72	++++++++++++++++++++++++
5:30	86	119	72	++++++++++++++++++++++++
6:00	83	115	72	++++++++++++++++++++++++
6:30	84	117	72	++++++++++++++++++++++++
7:00	84	117	72	++++++++++++++++++++++++
7:30	84	117	72	++++++++++++++++++++++++
8:00	82	114	72	++++++++++++++++++++++++
8:30	82	114	72	++++++++++++++++++++++++
9:00	83	112	74	++++++++++++++++++++++++
9:30	83	115	72	++++++++++++++++++++++++
10:00	86	116	74	++++++++++++++++++++++++
10:30	87	118	74	++++++++++++++++++++++++
11:00	87	118	74	++++++++++++++++++++++++
11:30	86	118	73	++++++++++++++++++++++++
12:00	83	115	72	++++++++++++++++++++++++
12:30	87	119	73	++++++++++++++++++++++++
13:00	88	121	73	++++++++++++++++++++++++
13:30	83	117	71	++++++++++++++++++++++++
14:00	84	117	72	++++++++++++++++++++++++
14:30	85	118	72	++++++++++++++++++++++++
15:00	85	118	72	++++++++++++++++++++++++
15:30	85	121	70	++++++++++++++++++++++++
16:00	84	117	72	++++++++++++++++++++++++
16:30	87	118	74	++++++++++++++++++++++++
17:00	83	114	73	++++++++++++++++++++++++
17:30	84	117	72	++++++++++++++++++++++++
18:00	82	115	71	++++++++++++++++++++++++
18:30	81	114	71	++++++++++++++++++++++++
19:00	82	114	72	++++++++++++++++++++++++
19:30	85	118	72	++++++++++++++++++++++++
20:00	87	119	73	++++++++++++++++++++++++
20:30	86	119	72	++++++++++++++++++++++++
21:00	83	115	72	++++++++++++++++++++++++
21:30	84	117	72	++++++++++++++++++++++++
22:00	83	115	72	++++++++++++++++++++++++
22:30	89	119	75	++++++++++++++++++++++++
23:00	87	118	74	++++++++++++++++++++++++
23:30	86	119	72	++++++++++++++++++++++++
24:00	82	115	71	++++++++++++++++++++++++

2027 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
28 DAY

DAILY LOAD PROFILE

Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	82	115	71	++++++++++++++++++++++++
1:00	81	114	71	++++++++++++++++++++++++
1:30	82	115	71	++++++++++++++++++++++++
2:00	83	117	71	+++++++++++++++++++++++++
2:30	82	115	71	++++++++++++++++++++++++
3:00	80	114	70	++++++++++++++++++++++++
3:30	81	114	71	++++++++++++++++++++++++
4:00	81	114	71	++++++++++++++++++++++++
4:30	85	116	73	+++++++++++++++++++++++++
5:00	85	118	72	+++++++++++++++++++++++++
5:30	83	115	72	+++++++++++++++++++++++++
6:00	81	113	72	++++++++++++++++++++++++
6:30	84	115	73	+++++++++++++++++++++++++
7:00	83	115	72	+++++++++++++++++++++++++
7:30	86	118	73	+++++++++++++++++++++++++
8:00	92	121	76	++++++++++++++++++++++++++++
8:30	53	62	86	++++++++++++++
9:00	47	51	92	++++++++++++
9:30	50	56	90	++++++++++++++
10:00	55	60	92	++++++++++++++
10:30	56	61	92	++++++++++++++
11:00	55	60	92	++++++++++++++
11:30	89	107	83	+++++++++++++++++++++++++
12:00	118	148	80	+++++++++++++++++++++++++++++++++
12:30	106	134	79	+++++++++++++++++++++++++++
13:00	110	139	79	++++++++++++++++++++++++++++
13:30	101	131	77	+++++++++++++++++++++++++
14:00	108	138	78	++++++++++++++++++++++++++
14:30	108	138	78	++++++++++++++++++++++++++
15:00	97	129	75	+++++++++++++++++++++++
15:30	97	129	75	+++++++++++++++++++++++
16:00	95	128	74	++++++++++++++++++++++
16:30	89	120	74	++++++++++++++++++++
17:00	90	122	74	++++++++++++++++++++
17:30	85	118	72	++++++++++++++++++++
18:00	90	123	73	+++++++++++++++++++++
18:30	83	117	71	++++++++++++++++++++
19:00	85	118	72	++++++++++++++++++++
19:30	87	119	73	+++++++++++++++++++++
20:00	87	119	73	+++++++++++++++++++++
20:30	87	119	73	+++++++++++++++++++++
21:00	89	120	74	++++++++++++++++++++
21:30	85	118	72	++++++++++++++++++++
22:00	86	119	72	++++++++++++++++++++
22:30	89	119	75	+++++++++++++++++++++
23:00	84	115	73	+++++++++++++++++++++
23:30	88	122	72	++++++++++++++++++++
24:00	82	115	71	++++++++++++++++++++

2031 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
29 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	83	117	71	++++++++++++++++++++++++
1:00	85	118	72	++++++++++++++++++++++++
1:30	81	114	71	++++++++++++++++++++++
2:00	83	117	71	++++++++++++++++++++++++
2:30	82	115	71	++++++++++++++++++++++
3:00	81	114	71	++++++++++++++++++++++
3:30	84	118	71	++++++++++++++++++++++++
4:00	82	115	71	++++++++++++++++++++++
4:30	85	116	73	++++++++++++++++++++++++
5:00	87	119	73	++++++++++++++++++++++++
5:30	83	115	72	++++++++++++++++++++++
6:00	84	117	72	++++++++++++++++++++++
6:30	89	120	74	++++++++++++++++++++++++
7:00	88	121	73	++++++++++++++++++++++++
7:30	92	123	75	++++++++++++++++++++++++
8:00	98	127	77	++++++++++++++++++++++++
8:30	93	122	76	++++++++++++++++++++++++
9:00	91	120	76	++++++++++++++++++++++++
9:30	94	124	76	++++++++++++++++++++++++
10:00	96	125	77	++++++++++++++++++++++++
10:30	97	126	77	++++++++++++++++++++++++
11:00	97	124	78	++++++++++++++++++++++++
11:30	94	125	75	++++++++++++++++++++++++
12:00	94	125	75	++++++++++++++++++++++++
12:30	97	128	76	++++++++++++++++++++++++
13:00	92	123	75	++++++++++++++++++++++++
13:30	95	125	76	++++++++++++++++++++++++
14:00	92	123	75	++++++++++++++++++++++++
14:30	98	129	76	++++++++++++++++++++++++
15:00	93	124	75	++++++++++++++++++++++++
15:30	91	123	74	++++++++++++++++++++++++
16:00	89	122	73	++++++++++++++++++++++++
16:30	88	121	73	++++++++++++++++++++++++
17:00	81	114	71	++++++++++++++++++++++
17:30	90	123	73	++++++++++++++++++++++++
18:00	83	115	72	++++++++++++++++++++++
18:30	87	119	73	++++++++++++++++++++++++
19:00	83	115	72	++++++++++++++++++++++
19:30	89	120	74	++++++++++++++++++++++++
20:00	86	118	73	++++++++++++++++++++++++
20:30	90	122	74	++++++++++++++++++++++++
21:00	88	119	74	++++++++++++++++++++++++
21:30	86	118	73	++++++++++++++++++++++++
22:00	90	122	74	++++++++++++++++++++++++
22:30	89	119	75	++++++++++++++++++++++++
23:00	92	123	75	++++++++++++++++++++++++
23:30	86	118	73	++++++++++++++++++++++++
24:00	83	115	72	++++++++++++++++++++++++

2131 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
30 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	89	122	73	++++++++++++++++++++++++++
1:00	84	118	71	++++++++++++++++++++++++
1:30	86	119	72	++++++++++++++++++++++++
2:00	81	114	71	++++++++++++++++++++++
2:30	87	119	73	++++++++++++++++++++++++++
3:00	83	115	72	++++++++++++++++++++++++
3:30	84	117	72	++++++++++++++++++++++++
4:00	83	115	72	++++++++++++++++++++++++
4:30	86	116	74	++++++++++++++++++++++++
5:00	88	119	74	++++++++++++++++++++++++
5:30	83	115	72	++++++++++++++++++++++++
6:00	90	122	74	++++++++++++++++++++++++++
6:30	86	118	73	++++++++++++++++++++++++
7:00	87	119	73	++++++++++++++++++++++++
7:30	91	121	75	++++++++++++++++++++++++++
8:00	73	94	78	++++++++++++++++++++
8:30	62	78	80	++++++++++++++++++
9:00	62	75	83	++++++++++++++++++
9:30	65	81	80	++++++++++++++++++
10:00	70	83	84	++++++++++++++++++++
10:30	69	81	85	++++++++++++++++++++
11:00	69	82	84	++++++++++++++++++++
11:30	59	72	82	++++++++++++++++
12:00	50	56	89	++++++++++++++
12:30	51	57	90	++++++++++++++
13:00	68	80	85	++++++++++++++++++
13:30	70	84	83	++++++++++++++++++
14:00	70	85	82	++++++++++++++++++
14:30	66	80	83	++++++++++++++++++
15:00	74	87	85	++++++++++++++++++++
15:30	64	83	77	++++++++++++++++++
16:00	92	124	74	++++++++++++++++++++++++++
16:30	94	125	75	+++++++++++++++++++++++++++
17:00	88	119	74	++++++++++++++++++++++++
17:30	87	121	72	++++++++++++++++++++++++
18:00	92	124	74	++++++++++++++++++++++++++
18:30	83	117	71	++++++++++++++++++++++++
19:00	84	117	72	++++++++++++++++++++++++
19:30	90	122	74	++++++++++++++++++++++++++
20:00	85	116	73	++++++++++++++++++++++++
20:30	88	119	74	++++++++++++++++++++++++
21:00	87	118	74	++++++++++++++++++++++++
21:30	90	122	74	++++++++++++++++++++++++++
22:00	83	115	72	++++++++++++++++++++++++
22:30	89	117	76	++++++++++++++++++++++++
23:00	89	119	75	++++++++++++++++++++++++
23:30	86	118	73	++++++++++++++++++++++++
24:00	84	117	72	++++++++++++++++++++++++

1911 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
1 DAY

DAILY LOAD PROFILE
Ft. Campbell Mechanical Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	85	118	72	++++++++++++++++++++++++
1:00	84	115	73	++++++++++++++++++++++++
1:30	82	115	71	++++++++++++++++++++++
2:00	80	113	71	++++++++++++++++++++++
2:30	80	113	71	++++++++++++++++++++++
3:00	80	114	70	++++++++++++++++++++++
3:30	84	117	72	++++++++++++++++++++++++
4:00	81	114	71	++++++++++++++++++++++
4:30	84	115	73	++++++++++++++++++++++++
5:00	82	114	72	++++++++++++++++++++++
5:30	82	115	71	++++++++++++++++++++++
6:00	86	118	73	++++++++++++++++++++++++
6:30	83	115	72	++++++++++++++++++++++
7:00	86	119	72	++++++++++++++++++++++
7:30	90	122	74	+++++++++++++++++++++++++
8:00	93	124	75	+++++++++++++++++++++++++
8:30	91	120	76	+++++++++++++++++++++++++
9:00	91	120	76	+++++++++++++++++++++++++
9:30	92	123	75	+++++++++++++++++++++++++
10:00	97	126	77	++++++++++++++++++++++++++
10:30	101	129	78	+++++++++++++++++++++++++++
11:00	93	122	76	+++++++++++++++++++++++++
11:30	95	127	75	++++++++++++++++++++++++++
12:00	93	124	75	+++++++++++++++++++++++++
12:30	102	131	78	+++++++++++++++++++++++++++
13:00	95	125	76	+++++++++++++++++++++++++
13:30	92	123	75	+++++++++++++++++++++++++
14:00	102	132	77	++++++++++++++++++++++++++
14:30	108	137	79	+++++++++++++++++++++++++++
15:00	103	132	78	+++++++++++++++++++++++++++
15:30	90	122	74	++++++++++++++++++++++++
16:00	89	122	73	++++++++++++++++++++++++
16:30	86	118	73	++++++++++++++++++++++++
17:00	87	119	73	++++++++++++++++++++++++
17:30	84	118	71	++++++++++++++++++++++++
18:00	87	119	73	++++++++++++++++++++++++
18:30	84	117	72	++++++++++++++++++++++++
19:00	83	115	72	++++++++++++++++++++++++
19:30	87	119	73	++++++++++++++++++++++++
20:00	87	119	73	++++++++++++++++++++++++
20:30	87	119	73	++++++++++++++++++++++++
21:00	84	117	72	++++++++++++++++++++++++
21:30	90	122	74	+++++++++++++++++++++++++
22:00	81	113	72	++++++++++++++++++++++
22:30	87	116	75	++++++++++++++++++++++++
23:00	90	120	75	+++++++++++++++++++++++++
23:30	82	115	71	++++++++++++++++++++++
24:00	84	118	71	++++++++++++++++++++++

2123 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
3 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	26	31	85	++++++++++++++++++++++
1:00	26	31	85	++++++++++++++++++++++
1:30	26	31	85	++++++++++++++++++++++
2:00	27	32	85	+++++++++++++++++++++++
2:30	27	32	85	+++++++++++++++++++++++
3:00	26	31	85	++++++++++++++++++++++
3:30	26	31	85	++++++++++++++++++++++
4:00	28	33	86	+++++++++++++++++++++++
4:30	30	34	89	+++++++++++++++++++++++
5:00	29	34	86	+++++++++++++++++++++++
5:30	27	32	85	+++++++++++++++++++++++
6:00	26	31	85	++++++++++++++++++++++
6:30	31	35	88	+++++++++++++++++++++++
7:00	28	32	87	+++++++++++++++++++++++
7:30	26	31	84	++++++++++++++++++++++
8:00	27	32	85	+++++++++++++++++++++++
8:30	26	30	87	++++++++++++++++++++++
9:00	24	27	89	++++++++++++++++++++
9:30	27	32	85	+++++++++++++++++++++++
10:00	27	31	87	+++++++++++++++++++++++
10:30	29	33	88	+++++++++++++++++++++++
11:00	29	34	86	+++++++++++++++++++++++
11:30	28	33	85	+++++++++++++++++++++++
12:00	28	33	85	+++++++++++++++++++++++
12:30	29	33	88	+++++++++++++++++++++++
13:00	27	31	87	+++++++++++++++++++++++
13:30	28	33	85	+++++++++++++++++++++++
14:00	27	31	86	+++++++++++++++++++++++
14:30	31	35	88	+++++++++++++++++++++++
15:00	29	33	87	+++++++++++++++++++++++
15:30	26	31	85	++++++++++++++++++++++
16:00	28	32	87	+++++++++++++++++++++++
16:30	28	31	89	+++++++++++++++++++++++
17:00	26	29	89	++++++++++++++++++++++
17:30	28	33	85	+++++++++++++++++++++++
18:00	26	31	85	++++++++++++++++++++++
18:30	28	33	85	+++++++++++++++++++++++
19:00	26	31	85	++++++++++++++++++++++
19:30	27	32	85	+++++++++++++++++++++++
20:00	27	32	85	+++++++++++++++++++++++
20:30	26	31	85	++++++++++++++++++++++
21:00	27	32	85	+++++++++++++++++++++++
21:30	26	31	85	++++++++++++++++++++++
22:00	27	31	87	+++++++++++++++++++++++
22:30	33	35	93	+++++++++++++++++++++++
23:00	30	33	92	+++++++++++++++++++++++
23:30	28	33	85	+++++++++++++++++++++++
24:00	27	32	85	+++++++++++++++++++++++

660 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
4 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	32	85	++++++++++++++++++++++
1:00	26	31	85	++++++++++++++++++++++
1:30	27	32	85	++++++++++++++++++++++
2:00	27	32	85	++++++++++++++++++++++
2:30	26	31	85	++++++++++++++++++++++
3:00	28	33	85	++++++++++++++++++++++
3:30	26	31	85	++++++++++++++++++++++
4:00	28	33	86	+++++++++++++++++++++++
4:30	30	33	90	+++++++++++++++++++++++++
5:00	29	34	86	+++++++++++++++++++++++
5:30	28	33	85	++++++++++++++++++++++
6:00	28	33	85	++++++++++++++++++++++
6:30	30	34	88	++++++++++++++++++++++++
7:00	29	33	87	+++++++++++++++++++++++
7:30	27	32	85	++++++++++++++++++++++
8:00	26	31	85	++++++++++++++++++++++
8:30	26	30	87	++++++++++++++++++++++
9:00	25	28	89	++++++++++++++++++++++
9:30	26	30	86	++++++++++++++++++++++
10:00	28	32	87	+++++++++++++++++++++++
10:30	29	33	88	++++++++++++++++++++++++
11:00	28	33	86	+++++++++++++++++++++++
11:30	28	33	86	+++++++++++++++++++++++
12:00	27	32	85	++++++++++++++++++++++
12:30	29	33	88	++++++++++++++++++++++++
13:00	27	31	87	+++++++++++++++++++++++
13:30	28	33	85	++++++++++++++++++++++
14:00	27	31	86	+++++++++++++++++++++++
14:30	30	34	88	++++++++++++++++++++++++
15:00	29	33	87	+++++++++++++++++++++++
15:30	26	31	85	++++++++++++++++++++++
16:00	28	32	87	+++++++++++++++++++++++
16:30	28	31	89	+++++++++++++++++++++++
17:00	26	29	89	++++++++++++++++++++++
17:30	28	33	86	+++++++++++++++++++++++
18:00	27	32	85	++++++++++++++++++++++
18:30	28	33	85	++++++++++++++++++++++
19:00	26	31	85	++++++++++++++++++++++
19:30	28	33	85	++++++++++++++++++++++
20:00	26	31	85	++++++++++++++++++++++
20:30	28	33	85	++++++++++++++++++++++
21:00	26	31	85	++++++++++++++++++++++
21:30	27	32	85	++++++++++++++++++++++
22:00	27	31	87	+++++++++++++++++++++++
22:30	33	35	93	+++++++++++++++++++++++++++
23:00	30	33	92	++++++++++++++++++++++++
23:30	28	33	85	++++++++++++++++++++++
24:00	28	33	85	++++++++++++++++++++++

664 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
5 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	26	31	85	++++++++++++++++++++
1:00	28	33	85	++++++++++++++++++++++
1:30	26	31	85	++++++++++++++++++++
2:00	27	32	85	+++++++++++++++++++++
2:30	26	31	85	++++++++++++++++++++
3:00	26	31	85	++++++++++++++++++++
3:30	27	32	85	+++++++++++++++++++++
4:00	27	31	86	+++++++++++++++++++++
4:30	30	33	90	++++++++++++++++++++++++
5:00	29	34	86	+++++++++++++++++++++++
5:30	28	33	85	++++++++++++++++++++++
6:00	28	33	85	++++++++++++++++++++++
6:30	29	33	88	+++++++++++++++++++++++
7:00	30	34	87	++++++++++++++++++++++++
7:30	29	33	88	+++++++++++++++++++++++
8:00	33	37	89	++++++++++++++++++++++++++
8:30	31	34	91	+++++++++++++++++++++++
9:00	31	33	93	+++++++++++++++++++++++
9:30	31	34	90	+++++++++++++++++++++++
10:00	33	37	90	++++++++++++++++++++++++
10:30	34	37	91	+++++++++++++++++++++++++
11:00	34	38	90	+++++++++++++++++++++++++
11:30	34	38	90	+++++++++++++++++++++++++
12:00	33	37	90	++++++++++++++++++++++++
12:30	35	38	91	+++++++++++++++++++++++++++
13:00	33	36	91	++++++++++++++++++++++++
13:30	33	37	90	++++++++++++++++++++++++
14:00	33	37	90	++++++++++++++++++++++++
14:30	37	40	92	+++++++++++++++++++++++++++++
15:00	36	40	91	+++++++++++++++++++++++++++
15:30	34	38	90	+++++++++++++++++++++++++
16:00	32	36	90	++++++++++++++++++++++++
16:30	28	31	89	++++++++++++++++++++
17:00	27	30	90	+++++++++++++++++++++
17:30	29	34	86	+++++++++++++++++++++++
18:00	28	33	86	++++++++++++++++++++
18:30	28	33	86	++++++++++++++++++++
19:00	28	33	86	++++++++++++++++++++
19:30	28	33	85	++++++++++++++++++++
20:00	28	33	85	++++++++++++++++++++
20:30	28	33	85	++++++++++++++++++++
21:00	28	33	85	++++++++++++++++++++
21:30	28	33	85	++++++++++++++++++++
22:00	28	32	87	++++++++++++++++++++
22:30	33	35	93	++++++++++++++++++++++++
23:00	30	33	92	++++++++++++++++++++++
23:30	28	33	85	++++++++++++++++++++
24:00	28	33	85	++++++++++++++++++++

719 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
6 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	28	33	85	++++++++++++++++++++++++
1:00	28	33	85	++++++++++++++++++++++++
1:30	27	32	85	+++++++++++++++++++++++
2:00	27	32	85	+++++++++++++++++++++++
2:30	27	32	85	+++++++++++++++++++++++
3:00	28	33	85	++++++++++++++++++++++++
3:30	28	33	85	++++++++++++++++++++++++
4:00	28	33	86	++++++++++++++++++++++++
4:30	30	33	90	++++++++++++++++++++++++++
5:00	29	33	87	+++++++++++++++++++++++++
5:30	28	33	85	++++++++++++++++++++++++
6:00	28	33	86	++++++++++++++++++++++++
6:30	31	35	88	+++++++++++++++++++++++++
7:00	28	32	87	+++++++++++++++++++++++++
7:30	30	34	87	+++++++++++++++++++++++++
8:00	33	37	89	++++++++++++++++++++++++++
8:30	32	35	91	+++++++++++++++++++++++++
9:00	31	33	93	+++++++++++++++++++++++++
9:30	33	37	89	++++++++++++++++++++++++++
10:00	34	38	90	+++++++++++++++++++++++++++
10:30	34	37	91	+++++++++++++++++++++++++++
11:00	34	38	89	+++++++++++++++++++++++++++
11:30	34	38	89	+++++++++++++++++++++++++++
12:00	33	37	89	++++++++++++++++++++++++++
12:30	35	38	91	+++++++++++++++++++++++++++++
13:00	34	38	90	+++++++++++++++++++++++++++
13:30	33	37	89	++++++++++++++++++++++++++
14:00	34	38	90	+++++++++++++++++++++++++++
14:30	37	40	92	++++++++++++++++++++++++++++++
15:00	35	38	91	+++++++++++++++++++++++++++
15:30	29	33	87	+++++++++++++++++++++++++
16:00	29	33	88	+++++++++++++++++++++++++
16:30	29	32	90	+++++++++++++++++++++++++
17:00	27	30	90	+++++++++++++++++++++++
17:30	29	34	86	+++++++++++++++++++++++++
18:00	26	30	86	++++++++++++++++++++++
18:30	28	33	86	++++++++++++++++++++++++
19:00	28	33	86	++++++++++++++++++++++++
19:30	28	33	86	++++++++++++++++++++++++
20:00	28	33	86	++++++++++++++++++++++++
20:30	28	33	86	++++++++++++++++++++++++
21:00	28	33	86	++++++++++++++++++++++++
21:30	28	33	86	++++++++++++++++++++++++
22:00	29	33	88	+++++++++++++++++++++++++
22:30	34	36	94	+++++++++++++++++++++++++++++
23:00	30	33	92	+++++++++++++++++++++++++++
23:30	28	33	86	++++++++++++++++++++++++
24:00	28	33	86	++++++++++++++++++++++++

723 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
7 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	28	33	86	++++++++++++++++++++++
1:00	28	33	86	++++++++++++++++++++++
1:30	28	33	86	++++++++++++++++++++++
2:00	28	33	86	++++++++++++++++++++++
2:30	28	33	86	++++++++++++++++++++++
3:00	28	33	86	++++++++++++++++++++++
3:30	28	33	86	++++++++++++++++++++++
4:00	28	32	87	++++++++++++++++++++++
4:30	31	34	90	++++++++++++++++++++++++
5:00	29	33	87	++++++++++++++++++++++
5:30	28	33	86	++++++++++++++++++++++
6:00	28	33	86	++++++++++++++++++++++
6:30	32	36	89	+++++++++++++++++++++++
7:00	31	35	88	++++++++++++++++++++++
7:30	33	37	89	+++++++++++++++++++++++
8:00	33	37	89	+++++++++++++++++++++++
8:30	32	36	90	++++++++++++++++++++++
9:00	29	31	93	++++++++++++++++++++++
9:30	33	37	89	+++++++++++++++++++++++
10:00	32	36	90	++++++++++++++++++++++
10:30	35	38	91	++++++++++++++++++++++++
11:00	34	38	89	+++++++++++++++++++++++
11:30	34	38	89	+++++++++++++++++++++++
12:00	34	38	89	+++++++++++++++++++++++
12:30	36	40	91	++++++++++++++++++++++++
13:00	35	39	90	+++++++++++++++++++++++
13:30	31	34	90	++++++++++++++++++++++
14:00	33	37	90	+++++++++++++++++++++++
14:30	36	40	91	++++++++++++++++++++++++
15:00	34	37	91	++++++++++++++++++++++++
15:30	33	37	89	+++++++++++++++++++++++
16:00	27	31	87	++++++++++++++++++++
16:30	28	31	89	++++++++++++++++++++++
17:00	27	30	89	++++++++++++++++++++
17:30	28	33	85	++++++++++++++++++++++
18:00	27	32	85	++++++++++++++++++++
18:30	28	33	85	++++++++++++++++++++++
19:00	26	31	85	++++++++++++++++++++
19:30	28	33	85	++++++++++++++++++++++
20:00	26	31	85	++++++++++++++++++++
20:30	27	32	85	++++++++++++++++++++
21:00	27	32	85	++++++++++++++++++++
21:30	27	32	85	++++++++++++++++++++
22:00	28	32	87	++++++++++++++++++++++
22:30	34	37	93	++++++++++++++++++++++++
23:00	30	33	92	+++++++++++++++++++++++
23:30	28	33	85	++++++++++++++++++++++
24:00	28	33	85	++++++++++++++++++++++

722 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
8 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	26	31	85	++++++++++++++++++++
1:00	28	33	85	++++++++++++++++++++++
1:30	26	31	85	++++++++++++++++++++
2:00	28	33	85	++++++++++++++++++++++
2:30	26	31	85	++++++++++++++++++++
3:00	28	33	85	++++++++++++++++++++++
3:30	26	31	85	++++++++++++++++++++
4:00	28	32	87	++++++++++++++++++++++
4:30	31	34	90	+++++++++++++++++++++++++
5:00	29	33	87	++++++++++++++++++++++
5:30	28	33	85	++++++++++++++++++++++
6:00	28	33	86	++++++++++++++++++++++
6:30	30	34	89	+++++++++++++++++++++++
7:00	32	36	89	++++++++++++++++++++++++
7:30	32	36	89	++++++++++++++++++++++++
8:00	32	36	89	++++++++++++++++++++++++
8:30	32	36	90	++++++++++++++++++++++++
9:00	29	31	93	++++++++++++++++++++
9:30	32	36	90	++++++++++++++++++++++++
10:00	32	35	92	++++++++++++++++++++++++
10:30	33	36	92	+++++++++++++++++++++++++
11:00	33	37	90	+++++++++++++++++++++++++
11:30	33	37	90	+++++++++++++++++++++++++
12:00	33	37	90	+++++++++++++++++++++++++
12:30	35	38	92	++++++++++++++++++++++++++++
13:00	31	34	91	++++++++++++++++++++
13:30	33	37	90	+++++++++++++++++++++++++
14:00	33	37	90	+++++++++++++++++++++++++
14:30	36	39	92	++++++++++++++++++++++++++++
15:00	33	36	92	+++++++++++++++++++++++++
15:30	30	34	88	+++++++++++++++++++++
16:00	28	32	88	++++++++++++++++++++
16:30	28	31	91	++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++
17:30	28	32	87	++++++++++++++++++++
18:00	28	32	87	++++++++++++++++++++
18:30	27	31	87	++++++++++++++++++++
19:00	25	29	87	++++++++++++++++++
19:30	28	32	87	++++++++++++++++++++
20:00	27	31	87	++++++++++++++++++++
20:30	26	30	87	++++++++++++++++++
21:00	26	30	87	++++++++++++++++++
21:30	27	31	87	++++++++++++++++++++
22:00	28	32	88	++++++++++++++++++++
22:30	33	35	94	++++++++++++++++++++++++
23:00	29	31	93	++++++++++++++++++++
23:30	27	31	87	++++++++++++++++++++
24:00	27	31	87	++++++++++++++++++++

707 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
9 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	87	+++++++++++++++++++++++
1:00	27	31	87	+++++++++++++++++++++++
1:30	25	29	87	+++++++++++++++++++++
2:00	27	31	87	+++++++++++++++++++++++
2:30	27	31	87	+++++++++++++++++++++++
3:00	27	31	87	+++++++++++++++++++++++
3:30	27	31	87	+++++++++++++++++++++++
4:00	26	30	88	++++++++++++++++++++++
4:30	30	33	91	++++++++++++++++++++++++++
5:00	29	33	88	++++++++++++++++++++++++
5:30	28	32	87	+++++++++++++++++++++++
6:00	28	32	87	+++++++++++++++++++++++
6:30	31	34	90	+++++++++++++++++++++++++
7:00	29	33	89	++++++++++++++++++++++++
7:30	32	36	90	+++++++++++++++++++++++++
8:00	33	37	90	+++++++++++++++++++++++++
8:30	31	34	92	+++++++++++++++++++++++++
9:00	29	31	94	+++++++++++++++++++++++++
9:30	33	36	91	+++++++++++++++++++++++++
10:00	33	36	92	+++++++++++++++++++++++++
10:30	34	37	92	++++++++++++++++++++++++++
11:00	34	37	91	++++++++++++++++++++++++++
11:30	33	36	91	+++++++++++++++++++++++++
12:00	33	36	91	+++++++++++++++++++++++++
12:30	35	38	92	++++++++++++++++++++++++++
13:00	34	37	91	++++++++++++++++++++++++++
13:30	31	34	91	+++++++++++++++++++++++++
14:00	34	37	91	++++++++++++++++++++++++++
14:30	36	39	92	++++++++++++++++++++++++++
15:00	30	34	89	++++++++++++++++++++++++++
15:30	27	31	87	+++++++++++++++++++++++
16:00	28	32	88	++++++++++++++++++++++++
16:30	28	31	90	++++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++++
17:30	28	32	87	++++++++++++++++++++++++
18:00	28	32	87	++++++++++++++++++++++++
18:30	28	32	87	++++++++++++++++++++++++
19:00	27	31	87	+++++++++++++++++++++++
19:30	27	31	87	+++++++++++++++++++++++
20:00	25	29	87	+++++++++++++++++++++
20:30	28	32	87	++++++++++++++++++++++++
21:00	27	31	86	+++++++++++++++++++++++
21:30	27	31	86	+++++++++++++++++++++++
22:00	27	31	88	+++++++++++++++++++++++
22:30	33	35	94	+++++++++++++++++++++++++
23:00	29	31	93	++++++++++++++++++++++++
23:30	28	32	87	++++++++++++++++++++++++
24:00	27	31	86	+++++++++++++++++++++++

706 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
10 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft. Campbell, Kentucky

TIME ENDING	INT KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	86	++++++++++++++++++++++
1:00	27	31	86	++++++++++++++++++++++
1:30	27	31	86	++++++++++++++++++++++
2:00	26	30	86	++++++++++++++++++++
2:30	26	30	87	++++++++++++++++++++
3:00	27	31	86	++++++++++++++++++++++
3:30	27	31	86	++++++++++++++++++++++
4:00	28	32	88	++++++++++++++++++++++++
4:30	30	33	91	++++++++++++++++++++++++++
5:00	29	33	88	++++++++++++++++++++++++
5:30	27	31	87	++++++++++++++++++++++
6:00	28	32	87	++++++++++++++++++++++++
6:30	31	35	89	+++++++++++++++++++++++++++
7:00	30	34	88	++++++++++++++++++++++++++
7:30	27	31	86	++++++++++++++++++++++
8:00	27	31	86	++++++++++++++++++++++
8:30	26	30	88	++++++++++++++++++++
9:00	23	25	91	++++++++++++++++++
9:30	28	32	87	++++++++++++++++++++++++
10:00	28	32	88	++++++++++++++++++++++++
10:30	28	31	89	++++++++++++++++++++++
11:00	28	32	87	++++++++++++++++++++++++
11:30	28	32	87	++++++++++++++++++++++++
12:00	28	32	87	++++++++++++++++++++++++
12:30	29	33	89	+++++++++++++++++++++++++
13:00	29	33	88	+++++++++++++++++++++++++
13:30	27	31	87	++++++++++++++++++++++
14:00	28	32	87	++++++++++++++++++++++++
14:30	31	35	89	+++++++++++++++++++++++++++
15:00	30	34	88	++++++++++++++++++++++++++
15:30	27	31	87	++++++++++++++++++++++
16:00	28	32	88	++++++++++++++++++++++++
16:30	28	31	91	++++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++
17:30	28	32	87	++++++++++++++++++++++++
18:00	27	31	87	++++++++++++++++++++++
18:30	27	31	87	++++++++++++++++++++++
19:00	27	31	86	++++++++++++++++++++++
19:30	27	31	86	++++++++++++++++++++++
20:00	27	31	86	++++++++++++++++++++++
20:30	26	30	86	++++++++++++++++++++
21:00	24	28	87	++++++++++++++++++
21:30	27	31	86	++++++++++++++++++++++
22:00	28	32	88	++++++++++++++++++++++++
22:30	33	35	94	++++++++++++++++++++++++++++
23:00	29	31	93	++++++++++++++++++++++++
23:30	27	31	87	++++++++++++++++++++++
24:00	27	31	86	++++++++++++++++++++++

664 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
11 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	86	++++++++++++++++++++++
1:00	27	31	86	++++++++++++++++++++++
1:30	27	31	86	++++++++++++++++++++++
2:00	27	31	86	++++++++++++++++++++++
2:30	26	30	86	++++++++++++++++++++
3:00	25	29	87	++++++++++++++++++++
3:30	27	31	86	++++++++++++++++++++++
4:00	27	31	87	++++++++++++++++++++++
4:30	30	33	91	++++++++++++++++++++++++++
5:00	28	32	88	+++++++++++++++++++++++
5:30	27	31	86	++++++++++++++++++++++
6:00	27	31	86	++++++++++++++++++++++
6:30	31	35	89	++++++++++++++++++++++++++
7:00	29	33	88	+++++++++++++++++++++++
7:30	27	31	86	++++++++++++++++++++++
8:00	27	31	86	++++++++++++++++++++++
8:30	26	30	88	++++++++++++++++++++
9:00	25	28	90	++++++++++++++++++++
9:30	27	31	86	++++++++++++++++++++++
10:00	27	31	88	++++++++++++++++++++++
10:30	28	31	89	+++++++++++++++++++++++
11:00	28	32	87	+++++++++++++++++++++++
11:30	27	31	87	++++++++++++++++++++++
12:00	27	31	87	++++++++++++++++++++++
12:30	29	33	89	+++++++++++++++++++++++
13:00	28	32	88	+++++++++++++++++++++++
13:30	27	31	87	++++++++++++++++++++++
14:00	28	32	87	+++++++++++++++++++++++
14:30	31	34	90	++++++++++++++++++++++++++
15:00	30	34	89	++++++++++++++++++++++++++
15:30	27	31	87	++++++++++++++++++++++
16:00	28	32	88	+++++++++++++++++++++++
16:30	27	30	91	++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++
17:30	27	31	87	++++++++++++++++++++++
18:00	27	31	87	++++++++++++++++++++++
18:30	27	31	87	++++++++++++++++++++++
19:00	27	31	86	++++++++++++++++++++++
19:30	27	31	86	++++++++++++++++++++++
20:00	27	31	86	++++++++++++++++++++++
20:30	27	31	86	++++++++++++++++++++++
21:00	27	31	86	++++++++++++++++++++++
21:30	27	31	86	++++++++++++++++++++++
22:00	28	32	88	+++++++++++++++++++++++
22:30	33	35	94	++++++++++++++++++++++++++++
23:00	29	31	93	+++++++++++++++++++++++
23:30	27	31	86	++++++++++++++++++++++
24:00	27	31	87	++++++++++++++++++++++

661 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
12 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	86	++++++++++++++++++++++
1:00	27	31	86	++++++++++++++++++++++
1:30	27	31	86	++++++++++++++++++++++
2:00	27	31	86	++++++++++++++++++++++
2:30	27	31	86	++++++++++++++++++++++
3:00	26	30	86	++++++++++++++++++++
3:30	26	30	86	++++++++++++++++++++
4:00	27	31	87	++++++++++++++++++++++
4:30	29	32	91	+++++++++++++++++++++++++
5:00	28	32	88	++++++++++++++++++++++
5:30	27	31	86	++++++++++++++++++++++
6:00	27	31	87	++++++++++++++++++++++
6:30	30	34	89	+++++++++++++++++++++++++
7:00	29	33	88	++++++++++++++++++++++++
7:30	27	31	86	++++++++++++++++++++++
8:00	28	33	86	++++++++++++++++++++++
8:30	26	30	88	++++++++++++++++++++
9:00	26	29	90	++++++++++++++++++++
9:30	27	31	87	++++++++++++++++++++++
10:00	28	32	88	++++++++++++++++++++++
10:30	28	31	89	++++++++++++++++++++++
11:00	28	32	87	++++++++++++++++++++++
11:30	28	32	87	++++++++++++++++++++++
12:00	28	32	87	++++++++++++++++++++++
12:30	29	33	89	+++++++++++++++++++++++
13:00	28	32	88	++++++++++++++++++++++
13:30	27	31	87	++++++++++++++++++++++
14:00	28	32	87	++++++++++++++++++++++
14:30	31	35	89	+++++++++++++++++++++++++
15:00	30	34	88	+++++++++++++++++++++++++
15:30	27	31	87	++++++++++++++++++++++
16:00	28	32	88	++++++++++++++++++++++
16:30	28	31	91	++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++
17:30	28	32	87	++++++++++++++++++++++
18:00	27	31	87	++++++++++++++++++++++
18:30	27	31	87	++++++++++++++++++++++
19:00	27	31	87	++++++++++++++++++++++
19:30	27	31	86	++++++++++++++++++++++
20:00	27	31	86	++++++++++++++++++++++
20:30	27	31	86	++++++++++++++++++++++
21:00	27	31	86	++++++++++++++++++++++
21:30	27	31	86	++++++++++++++++++++++
22:00	28	32	88	++++++++++++++++++++++
22:30	33	35	94	+++++++++++++++++++++++++++
23:00	29	31	93	++++++++++++++++++++++++
23:30	27	31	86	++++++++++++++++++++++
24:00	27	31	86	++++++++++++++++++++++

664 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
13 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	86	++++++++++++++++++++++
1:00	27	31	86	++++++++++++++++++++++
1:30	27	31	86	++++++++++++++++++++++
2:00	27	31	86	++++++++++++++++++++++
2:30	27	31	86	++++++++++++++++++++++
3:00	27	31	86	++++++++++++++++++++++
3:30	27	31	86	++++++++++++++++++++++
4:00	27	31	88	++++++++++++++++++++++
4:30	30	33	91	++++++++++++++++++++++++++
5:00	28	32	88	++++++++++++++++++++++
5:30	27	31	86	++++++++++++++++++++++
6:00	27	31	87	++++++++++++++++++++++
6:30	30	34	89	++++++++++++++++++++++++
7:00	32	36	90	+++++++++++++++++++++++++
7:30	32	36	90	+++++++++++++++++++++++++
8:00	32	36	90	+++++++++++++++++++++++++
8:30	31	34	91	++++++++++++++++++++++++
9:00	31	33	94	++++++++++++++++++++++++
9:30	32	36	90	+++++++++++++++++++++++++
10:00	32	35	92	+++++++++++++++++++++++++
10:30	33	36	92	++++++++++++++++++++++++++
11:00	33	37	90	++++++++++++++++++++++++++
11:30	33	37	90	++++++++++++++++++++++++++
12:00	33	37	90	++++++++++++++++++++++++++
12:30	35	38	92	++++++++++++++++++++++++++++
13:00	34	37	91	+++++++++++++++++++++++++
13:30	33	37	90	++++++++++++++++++++++++++
14:00	33	36	91	++++++++++++++++++++++++++
14:30	36	39	92	++++++++++++++++++++++++++++
15:00	35	38	92	++++++++++++++++++++++++++++
15:30	33	37	90	++++++++++++++++++++++++++
16:00	30	34	89	++++++++++++++++++++++++
16:30	28	31	91	++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++
17:30	28	32	87	++++++++++++++++++++++
18:00	28	32	87	++++++++++++++++++++++
18:30	28	32	87	++++++++++++++++++++++
19:00	28	32	87	++++++++++++++++++++++
19:30	27	31	87	++++++++++++++++++++
20:00	27	31	87	++++++++++++++++++++
20:30	27	31	87	++++++++++++++++++++
21:00	27	31	87	++++++++++++++++++++
21:30	27	31	87	++++++++++++++++++++
22:00	28	31	89	++++++++++++++++++++++
22:30	33	35	95	++++++++++++++++++++++++++
23:00	30	32	93	++++++++++++++++++++++++
23:30	28	32	87	++++++++++++++++++++++
24:00	28	32	87	++++++++++++++++++++++

715 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
14 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	28	32	87	++++++++++++++++++++++++
1:00	28	32	87	++++++++++++++++++++++++
1:30	28	32	87	++++++++++++++++++++++++
2:00	28	32	87	++++++++++++++++++++++++
2:30	28	32	87	++++++++++++++++++++++++
3:00	28	32	87	++++++++++++++++++++++++
3:30	28	32	87	++++++++++++++++++++++++
4:00	28	31	89	++++++++++++++++++++++++
4:30	31	34	92	++++++++++++++++++++++++++
5:00	29	33	89	++++++++++++++++++++++++
5:30	28	32	87	++++++++++++++++++++++++
6:00	28	32	88	++++++++++++++++++++++++
6:30	31	34	90	+++++++++++++++++++++++++
7:00	33	36	91	++++++++++++++++++++++++++
7:30	32	36	90	+++++++++++++++++++++++++
8:00	33	37	90	+++++++++++++++++++++++++
8:30	32	35	92	++++++++++++++++++++++++
9:00	28	29	95	++++++++++++++++++++++
9:30	29	31	95	++++++++++++++++++++++
10:00	30	31	96	+++++++++++++++++++++++
10:30	31	32	96	+++++++++++++++++++++++
11:00	34	37	92	++++++++++++++++++++++++++
11:30	34	37	91	++++++++++++++++++++++++++
12:00	34	38	90	+++++++++++++++++++++++++
12:30	35	38	92	++++++++++++++++++++++++++
13:00	34	37	91	++++++++++++++++++++++++++
13:30	33	37	90	+++++++++++++++++++++++++
14:00	34	37	91	++++++++++++++++++++++++++
14:30	37	40	92	++++++++++++++++++++++++++++
15:00	33	36	91	++++++++++++++++++++++++++
15:30	28	32	87	++++++++++++++++++++++
16:00	28	32	88	++++++++++++++++++++++
16:30	29	33	89	+++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++
17:30	25	27	92	++++++++++++++++++++
18:00	25	27	92	++++++++++++++++++++
18:30	24	26	92	++++++++++++++++++++
19:00	27	30	89	+++++++++++++++++++++
19:30	28	32	87	++++++++++++++++++++++
20:00	27	31	87	++++++++++++++++++++
20:30	27	31	87	++++++++++++++++++++
21:00	27	31	87	++++++++++++++++++++
21:30	27	31	87	++++++++++++++++++++
22:00	28	32	88	++++++++++++++++++++++
22:30	34	37	93	++++++++++++++++++++++++++
23:00	31	34	90	+++++++++++++++++++++++
23:30	27	31	87	++++++++++++++++++++
24:00	27	31	86	++++++++++++++++++++

711 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
15 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	86	++++++++++++++++++++++
1:00	27	31	86	++++++++++++++++++++++
1:30	27	31	86	++++++++++++++++++++++
2:00	27	31	86	++++++++++++++++++++++
2:30	27	31	86	++++++++++++++++++++++
3:00	27	31	86	++++++++++++++++++++++
3:30	27	31	86	++++++++++++++++++++++
4:00	27	31	88	++++++++++++++++++++++
4:30	30	33	91	++++++++++++++++++++++++++
5:00	28	32	88	++++++++++++++++++++++
5:30	27	31	86	++++++++++++++++++++++
6:00	27	31	87	++++++++++++++++++++++
6:30	31	35	89	++++++++++++++++++++++++
7:00	30	34	89	++++++++++++++++++++++++
7:30	32	36	90	+++++++++++++++++++++++++
8:00	32	36	90	+++++++++++++++++++++++++
8:30	32	36	90	+++++++++++++++++++++++++
9:00	32	36	90	+++++++++++++++++++++++++
9:30	32	36	90	+++++++++++++++++++++++++
10:00	33	36	91	++++++++++++++++++++++++++
10:30	34	37	92	+++++++++++++++++++++++++++
11:00	33	36	91	++++++++++++++++++++++++++
11:30	33	37	90	+++++++++++++++++++++++++
12:00	33	37	90	+++++++++++++++++++++++++
12:30	35	38	92	+++++++++++++++++++++++++++
13:00	34	37	91	++++++++++++++++++++++++++
13:30	33	36	91	++++++++++++++++++++++++++
14:00	32	35	91	++++++++++++++++++++++++++
14:30	35	38	93	++++++++++++++++++++++++++++
15:00	34	37	92	+++++++++++++++++++++++++++
15:30	31	34	90	+++++++++++++++++++++++++
16:00	28	32	88	++++++++++++++++++++++
16:30	29	33	89	++++++++++++++++++++++++
17:00	26	29	91	++++++++++++++++++++++
17:30	25	27	92	++++++++++++++++++++++
18:00	25	27	92	++++++++++++++++++++++
18:30	24	26	92	++++++++++++++++++++
19:00	27	31	88	++++++++++++++++++++++
19:30	28	32	87	++++++++++++++++++++++
20:00	27	31	87	++++++++++++++++++++++
20:30	27	31	87	++++++++++++++++++++++
21:00	27	31	86	++++++++++++++++++++++
21:30	27	31	86	++++++++++++++++++++++
22:00	28	32	88	++++++++++++++++++++++
22:30	34	37	93	+++++++++++++++++++++++++++
23:00	30	34	89	++++++++++++++++++++++++
23:30	27	31	86	++++++++++++++++++++++
24:00	27	31	86	++++++++++++++++++++++

708 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
16 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	27	31	86	++++++++++++++++++++++
1:00	27	31	86	++++++++++++++++++++++
1:30	27	31	86	++++++++++++++++++++++
2:00	27	31	86	++++++++++++++++++++++
2:30	26	30	86	++++++++++++++++++++
3:00	26	30	86	++++++++++++++++++++
3:30	27	31	86	++++++++++++++++++++++
4:00	27	31	88	++++++++++++++++++++++
4:30	29	32	91	++++++++++++++++++++++++
5:00	28	32	88	++++++++++++++++++++++
5:30	27	31	86	++++++++++++++++++++
6:00	27	31	87	++++++++++++++++++++
6:30	30	34	89	++++++++++++++++++++++++
7:00	31	34	90	++++++++++++++++++++++++
7:30	31	34	90	++++++++++++++++++++++++
8:00	32	36	90	++++++++++++++++++++++++
8:30	32	36	90	++++++++++++++++++++++++
9:00	37	40	92	++++++++++++++++++++++++++++
9:30	23	25	91	++++++++++++++++++
10:00	23	25	93	++++++++++++++++++
10:30	23	24	94	++++++++++++++++++
11:00	23	25	91	++++++++++++++++++
11:30	23	25	91	++++++++++++++++++
12:00	23	25	91	++++++++++++++++++
12:30	25	27	93	++++++++++++++++++++
13:00	23	25	93	++++++++++++++++++
13:30	22	24	91	++++++++++++++++++
14:00	23	25	91	++++++++++++++++++
14:30	27	29	92	++++++++++++++++++++++
15:00	26	28	92	++++++++++++++++++++
15:30	23	26	90	++++++++++++++++++
16:00	24	26	91	++++++++++++++++++++
16:30	24	26	92	++++++++++++++++++++
17:00	23	26	89	++++++++++++++++++
17:30	18	21	84	++++++++++++++
18:00	18	21	84	++++++++++++++
18:30	18	21	84	++++++++++++++
19:00	18	21	84	++++++++++++++
19:30	18	21	84	++++++++++++++
20:00	18	21	84	++++++++++++++
20:30	18	21	84	++++++++++++++
21:00	18	21	84	++++++++++++++
21:30	19	22	87	+++++++++++++++
22:00	24	26	93	++++++++++++++++++++
22:30	21	24	89	+++++++++++++++++
23:00	18	21	84	++++++++++++++
23:30	18	21	84	++++++++++++++
24:00	27	31	86	++++++++++++++++++++++

584 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
17 DAY

DAILY LOAD PROFILE
Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	18	21	84	++++++++++++++++
1:00	18	21	84	++++++++++++++++
1:30	18	21	84	++++++++++++++++
2:00	18	21	84	++++++++++++++++
2:30	18	21	84	++++++++++++++++
3:00	18	21	84	++++++++++++++++
3:30	18	21	84	++++++++++++++++
4:00	18	21	86	++++++++++++++++
4:30	21	23	91	++++++++++++++++++++
5:00	19	22	86	++++++++++++++++++
5:30	18	21	84	++++++++++++++++
6:00	18	21	85	++++++++++++++++
6:30	22	25	88	++++++++++++++++++++
7:00	20	23	87	++++++++++++++++++
7:30	18	22	83	++++++++++++++++
8:00	18	21	84	++++++++++++++++
8:30	18	21	84	++++++++++++++++
9:00	18	21	84	++++++++++++++++
9:30	18	21	84	++++++++++++++++
10:00	18	21	86	++++++++++++++++
10:30	19	22	88	++++++++++++++++++
11:00	18	21	84	++++++++++++++++
11:30	18	21	84	++++++++++++++++
12:00	18	21	84	++++++++++++++++
12:30	20	23	88	++++++++++++++++++
13:00	20	22	89	++++++++++++++++++
13:30	20	22	89	++++++++++++++++++
14:00	19	22	88	++++++++++++++++++
14:30	22	24	91	++++++++++++++++++++
15:00	20	22	90	++++++++++++++++++
15:30	18	20	88	++++++++++++++++
16:00	18	20	90	++++++++++++++++
16:30	19	21	91	+++++++++++++++++
17:00	18	20	88	++++++++++++++++
17:30	18	20	88	++++++++++++++++
18:00	18	20	88	++++++++++++++++
18:30	18	20	88	++++++++++++++++
19:00	18	20	88	++++++++++++++++
19:30	18	20	88	++++++++++++++++
20:00	18	20	88	++++++++++++++++
20:30	18	20	88	++++++++++++++++
21:00	18	20	88	++++++++++++++++
21:30	18	20	88	++++++++++++++++
22:00	19	21	90	++++++++++++++++++
22:30	25	26	96	++++++++++++++++++++++++
23:00	22	24	92	++++++++++++++++++++
23:30	18	20	88	++++++++++++++++
24:00	18	20	88	++++++++++++++++

451 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
18 DAY

DAILY LOAD PROFILE

Ft. Campbell Boiler Room
Ft Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	18	20	88	++++++++++++++++
1:00	18	20	88	++++++++++++++++
1:30	18	20	88	++++++++++++++++
2:00	18	20	88	++++++++++++++++
2:30	18	20	88	++++++++++++++++
3:00	18	20	88	++++++++++++++++
3:30	18	20	88	++++++++++++++++
4:00	19	21	90	+++++++++++++++++
4:30	21	22	94	+++++++++++++++++++
5:00	20	22	90	+++++++++++++++++
5:30	18	20	88	++++++++++++++++
6:00	19	22	88	++++++++++++++++
6:30	22	24	91	++++++++++++++++++
7:00	21	23	90	+++++++++++++++++
7:30	18	20	88	++++++++++++++++
8:00	18	20	88	++++++++++++++++
8:30	20	22	90	+++++++++++++++++
9:00	18	20	88	++++++++++++++++
9:30	18	20	88	++++++++++++++++
10:00	19	21	89	+++++++++++++++++
10:30	19	21	90	+++++++++++++++++
11:00	19	22	86	+++++++++++++++++
11:30	19	22	86	+++++++++++++++++
12:00	19	22	86	+++++++++++++++++
12:30	21	24	89	++++++++++++++++++
13:00	20	23	88	++++++++++++++++++
13:30	18	21	86	++++++++++++++++
14:00	19	22	86	+++++++++++++++++
14:30	22	24	90	++++++++++++++++++++
15:00	21	24	88	+++++++++++++++++++
15:30	19	22	86	+++++++++++++++++
16:00	19	22	88	+++++++++++++++++
16:30	20	22	90	+++++++++++++++++
17:00	19	22	86	+++++++++++++++++
17:30	19	22	86	+++++++++++++++++
18:00	19	22	86	+++++++++++++++++
18:30	19	22	86	+++++++++++++++++
19:00	19	22	86	+++++++++++++++++
19:30	19	22	85	+++++++++++++++++
20:00	19	22	85	+++++++++++++++++
20:30	19	22	86	+++++++++++++++++
21:00	19	22	85	+++++++++++++++++
21:30	19	22	86	+++++++++++++++++
22:00	20	23	88	++++++++++++++++++
22:30	25	27	94	+++++++++++++++++++++++++
23:00	22	24	90	++++++++++++++++++++
23:30	19	22	86	+++++++++++++++++
24:00	19	22	86	+++++++++++++++++

464 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
26 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++
1:00	10	12	81	+++++++++
1:30	7	7	99	+++++
2:00	9	11	83	++++++++
2:30	9	11	81	++++++++
3:00	10	12	82	+++++++++
3:30	9	11	81	++++++++
4:00	10	12	82	+++++++++
4:30	9	11	81	++++++++
5:00	10	12	82	+++++++++
5:30	9	11	81	++++++++
6:00	10	12	81	+++++++++
6:30	9	11	81	++++++++
7:00	10	11	88	+++++++++
7:30	7	7	99	+++++
8:00	9	11	83	++++++++
8:30	9	11	81	++++++++
9:00	10	12	82	+++++++++
9:30	9	11	81	++++++++
10:00	10	12	81	+++++++++
10:30	9	11	81	++++++++
11:00	10	12	82	+++++++++
11:30	9	11	81	++++++++
12:00	10	12	82	+++++++++
12:30	9	11	81	++++++++
13:00	10	11	87	+++++++++
13:30	7	7	99	+++++
14:00	9	11	83	++++++++
14:30	9	11	81	++++++++
15:00	10	12	82	+++++++++
15:30	9	11	81	++++++++
16:00	10	12	82	+++++++++
16:30	9	11	81	++++++++
17:00	10	12	82	+++++++++
17:30	9	11	81	++++++++
18:00	10	12	82	+++++++++
18:30	9	11	81	++++++++
19:00	10	12	82	+++++++++
19:30	9	11	81	++++++++
20:00	10	12	82	+++++++++
20:30	9	11	81	++++++++
21:00	10	11	88	+++++++++
21:30	7	7	99	+++++
22:00	9	11	83	++++++++
22:30	9	11	81	++++++++
23:00	10	12	82	+++++++++
23:30	9	11	81	++++++++
24:00	10	12	81	+++++++++

222 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
27 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	10	12	81	++++++++++++++++++++++
1:00	9	11	81	++++++++++++++++++++
1:30	7	7	99	++++++++++++++
2:00	9	11	83	++++++++++++++++++++
2:30	9	11	81	++++++++++++++++++++
3:00	10	12	81	++++++++++++++++++++++
3:30	9	11	81	++++++++++++++++++++
4:00	10	12	81	++++++++++++++++++++++
4:30	9	11	81	++++++++++++++++++++
5:00	10	12	81	++++++++++++++++++++++
5:30	9	11	81	++++++++++++++++++++
6:00	9	11	81	++++++++++++++++++++
6:30	9	11	81	++++++++++++++++++++
7:00	9	10	87	++++++++++++++++++++
7:30	8	8	99	++++++++++++++++++
8:00	8	10	82	++++++++++++++++++
8:30	10	12	82	++++++++++++++++++++++
9:00	9	11	81	++++++++++++++++++++
9:30	9	11	81	++++++++++++++++++++
10:00	9	11	81	++++++++++++++++++++
10:30	9	11	81	++++++++++++++++++++
11:00	10	12	82	++++++++++++++++++++++
11:30	9	11	81	++++++++++++++++++++
12:00	10	12	82	++++++++++++++++++++++
12:30	9	11	81	++++++++++++++++++++
13:00	10	11	87	++++++++++++++++++++++
13:30	6	6	99	++++++++++++
14:00	9	11	83	++++++++++++++++++++
14:30	9	11	81	++++++++++++++++++++
15:00	10	12	82	++++++++++++++++++++++
15:30	9	11	81	++++++++++++++++++++
16:00	10	12	82	++++++++++++++++++++++
16:30	9	11	82	++++++++++++++++++++
17:00	9	11	81	++++++++++++++++++++
17:30	10	12	82	++++++++++++++++++++++
18:00	9	11	81	++++++++++++++++++++
18:30	10	12	82	++++++++++++++++++++++
19:00	9	11	81	++++++++++++++++++++
19:30	10	12	81	++++++++++++++++++++++
20:00	9	11	80	++++++++++++++++++++
20:30	10	12	81	++++++++++++++++++++++
21:00	9	10	87	++++++++++++++++++++
21:30	8	8	99	++++++++++++++++++
22:00	8	10	82	++++++++++++++++++
22:30	10	12	81	++++++++++++++++++++++
23:00	9	11	81	++++++++++++++++++++
23:30	9	11	81	++++++++++++++++++++
24:00	9	11	81	++++++++++++++++++++

219 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
28 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++++++++++++++
1:00	10	11	87	++++++++++++++++++++++
1:30	7	7	99	++++++++++++++
2:00	9	11	82	++++++++++++++++++++
2:30	9	11	81	++++++++++++++++++++
3:00	9	11	81	++++++++++++++++++++
3:30	9	11	81	++++++++++++++++++++
4:00	9	11	81	++++++++++++++++++++
4:30	10	12	81	++++++++++++++++++++++
5:00	9	11	81	++++++++++++++++++++
5:30	10	12	85	++++++++++++++++++++++
6:00	10	12	81	++++++++++++++++++++++
6:30	9	11	81	++++++++++++++++++++
7:00	10	11	87	++++++++++++++++++++++
7:30	7	7	99	++++++++++++++
8:00	8	10	82	++++++++++++++++++
8:30	10	12	82	++++++++++++++++++++++
9:00	9	11	81	++++++++++++++++++++
9:30	10	12	81	++++++++++++++++++++++
10:00	9	11	81	++++++++++++++++++++
10:30	9	11	81	++++++++++++++++++++
11:00	9	11	81	++++++++++++++++++++
11:30	9	11	81	++++++++++++++++++++
12:00	10	12	82	++++++++++++++++++++++
12:30	9	11	81	++++++++++++++++++++
13:00	10	11	87	++++++++++++++++++++++
13:30	7	7	99	++++++++++++++
14:00	9	11	82	++++++++++++++++++++
14:30	11	13	84	++++++++++++++++++++++++
15:00	10	12	83	++++++++++++++++++++++
15:30	11	13	83	++++++++++++++++++++++++
16:00	9	11	82	++++++++++++++++++++
16:30	10	12	82	++++++++++++++++++++++
17:00	9	11	82	++++++++++++++++++++
17:30	10	12	82	++++++++++++++++++++++
18:00	10	12	82	++++++++++++++++++++++
18:30	9	11	81	++++++++++++++++++++
19:00	10	12	82	++++++++++++++++++++++
19:30	9	11	81	++++++++++++++++++++
20:00	10	12	82	++++++++++++++++++++++
20:30	9	11	81	++++++++++++++++++++
21:00	10	11	87	++++++++++++++++++++++
21:30	7	7	99	++++++++++++++
22:00	9	11	83	++++++++++++++++++++
22:30	9	11	81	++++++++++++++++++++
23:00	10	12	81	++++++++++++++++++++++
23:30	9	11	81	++++++++++++++++++++
24:00	10	12	81	++++++++++++++++++++++

223 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
29 DAY

DAILY LOAD PROFILE

Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++++++++++++++
1:00	10	11	87	++++++++++++++++++++++
1:30	7	7	99	++++++++++++++++
2:00	8	10	82	++++++++++++++++++
2:30	10	12	81	++++++++++++++++++++++
3:00	9	11	81	++++++++++++++++++++
3:30	10	12	81	++++++++++++++++++++++
4:00	9	11	80	++++++++++++++++++++
4:30	9	11	81	++++++++++++++++++++
5:00	9	11	81	++++++++++++++++++++
5:30	9	11	81	++++++++++++++++++++
6:00	11	13	85	+++++++++++++++++++++++++
6:30	0	ERR	0 .	
7:00	0	ERR	0 .	
7:30	8	8	99	++++++++++++++++++
8:00	8	10	82	++++++++++++++++++
8:30	10	12	82	++++++++++++++++++++++
9:00	9	11	81	++++++++++++++++++++
9:30	9	11	81	++++++++++++++++++++
10:00	10	12	81	++++++++++++++++++++++
10:30	9	11	82	++++++++++++++++++++
11:00	10	12	82	++++++++++++++++++++++
11:30	9	11	81	++++++++++++++++++++
12:00	10	12	81	++++++++++++++++++++++
12:30	11	13	82	+++++++++++++++++++++++++
13:00	11	13	88	+++++++++++++++++++++++++
13:30	9	9	99	++++++++++++++++++++
14:00	9	11	83	++++++++++++++++++++
14:30	11	13	82	+++++++++++++++++++++++++
15:00	11	13	83	+++++++++++++++++++++++++
15:30	10	12	81	++++++++++++++++++++++
16:00	11	13	82	+++++++++++++++++++++++++
16:30	9	11	81	++++++++++++++++++++
17:00	10	12	81	++++++++++++++++++++++
17:30	9	11	80	++++++++++++++++++++
18:00	10	12	81	++++++++++++++++++++++
18:30	9	11	80	++++++++++++++++++++
19:00	10	12	81	++++++++++++++++++++++
19:30	9	11	80	++++++++++++++++++++
20:00	9	11	80	++++++++++++++++++++
20:30	10	13	80	+++++++++++++++++++++++++
21:00	9	10	86	++++++++++++++++++++
21:30	8	8	98	++++++++++++++++++
22:00	9	11	81	++++++++++++++++++++
22:30	10	12	81	++++++++++++++++++++++
23:00	9	11	80	++++++++++++++++++++
23:30	10	12	81	++++++++++++++++++++++
24:00	9	11	81	++++++++++++++++++++

217 KWH = ENERGY USE THIS DAY

1992 YEAR
Sept. MONTH
30 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++++++++++++++
1:00	9	11	80	++++++++++++++++++++
1:30	10	11	87	++++++++++++++++++++++
2:00	7	7	99	++++++++++++++++
2:30	9	11	82	++++++++++++++++++++
3:00	9	11	81	++++++++++++++++++++
3:30	9	11	81	++++++++++++++++++++
4:00	9	11	81	++++++++++++++++++++
4:30	9	11	80	++++++++++++++++++++
5:00	9	11	81	++++++++++++++++++++
5:30	9	11	80	++++++++++++++++++++
6:00	9	11	80	++++++++++++++++++++
6:30	9	11	81	++++++++++++++++++++
7:00	9	10	87	++++++++++++++++++++
7:30	7	7	99	++++++++++++++++
8:00	9	11	82	++++++++++++++++++++
8:30	10	12	82	++++++++++++++++++++++
9:00	9	11	81	++++++++++++++++++++
9:30	9	11	80	++++++++++++++++++++
10:00	10	12	81	++++++++++++++++++++++
10:30	9	11	80	++++++++++++++++++++
11:00	10	12	81	++++++++++++++++++++++
11:30	9	11	81	++++++++++++++++++++
12:00	9	11	81	++++++++++++++++++++
12:30	9	11	81	++++++++++++++++++++
13:00	9	10	87	++++++++++++++++++++
13:30	8	8	99	++++++++++++++++
14:00	8	10	82	++++++++++++++++
14:30	10	12	82	++++++++++++++++++++++
15:00	9	11	81	++++++++++++++++++++
15:30	10	12	81	++++++++++++++++++++++
16:00	9	11	81	++++++++++++++++++++
16:30	10	12	81	++++++++++++++++++++++
17:00	9	11	81	++++++++++++++++++++
17:30	9	11	81	++++++++++++++++++++
18:00	9	11	81	++++++++++++++++++++
18:30	9	11	81	++++++++++++++++++++
19:00	10	12	81	++++++++++++++++++++++
19:30	9	11	81	++++++++++++++++++++
20:00	9	11	81	++++++++++++++++++++
20:30	9	11	81	++++++++++++++++++++
21:00	9	10	87	++++++++++++++++++++
21:30	8	8	99	++++++++++++++++
22:00	8	10	82	++++++++++++++++
22:30	10	12	81	++++++++++++++++++++++
23:00	9	11	81	++++++++++++++++++++
23:30	10	12	81	++++++++++++++++++++++
24:00	9	11	80	++++++++++++++++++++

217 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
1 DAY

DAILY LOAD PROFILE

Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++++++++++++++
1:00	10	11	87	++++++++++++++++++++++
1:30	7	7	99	++++++++++++++
2:00	9	11	82	++++++++++++++++++++
2:30	9	11	81	++++++++++++++++++++
3:00	9	11	81	++++++++++++++++++++
3:30	9	11	81	++++++++++++++++++++
4:00	9	11	80	++++++++++++++++++++
4:30	9	11	81	++++++++++++++++++++
5:00	9	11	81	++++++++++++++++++++
5:30	9	11	80	++++++++++++++++++++
6:00	11	13	84	++++++++++++++++++++++++
6:30	9	11	82	++++++++++++++++++++
7:00	9	10	87	++++++++++++++++++++
7:30	8	8	99	++++++++++++++++
8:00	8	10	82	++++++++++++++++++
8:30	10	12	81	++++++++++++++++++++++
9:00	9	11	81	++++++++++++++++++++
9:30	9	11	81	++++++++++++++++++++
10:00	9	11	81	++++++++++++++++++++
10:30	9	11	80	++++++++++++++++++++
11:00	10	12	81	++++++++++++++++++++++
11:30	9	11	80	++++++++++++++++++++
12:00	10	12	81	++++++++++++++++++++++
12:30	9	11	80	++++++++++++++++++++
13:00	11	13	88	++++++++++++++++++++++++
13:30	8	8	98	++++++++++++++++
14:00	12	14	83	++++++++++++++++++++++++++
14:30	13	16	83	++++++++++++++++++++++++++++
15:00	12	14	84	++++++++++++++++++++++++++
15:30	14	17	84	++++++++++++++++++++++++++++++++
16:00	12	14	83	++++++++++++++++++++++++++
16:30	11	13	83	++++++++++++++++++++++
17:00	12	14	83	++++++++++++++++++++++++++
17:30	11	13	83	++++++++++++++++++++++
18:00	11	13	83	++++++++++++++++++++++
18:30	12	14	83	++++++++++++++++++++++++++
19:00	10	12	82	++++++++++++++++++++
19:30	11	13	83	++++++++++++++++++++++
20:00	12	14	83	++++++++++++++++++++++++++
20:30	10	12	82	++++++++++++++++++++
21:00	12	14	88	++++++++++++++++++++++++
21:30	8	8	99	++++++++++++++++
22:00	10	12	82	++++++++++++++++++++
22:30	10	12	81	++++++++++++++++++++
23:00	9	11	80	++++++++++++++++++
23:30	10	13	80	++++++++++++++++++++
24:00	0	ERR	0 .	

234 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
2 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	0	ERR	0.	
1:00	0	ERR	0.	
1:30	8	8	98	++++++++++++++++
2:00	0	ERR	0.	
2:30	0	ERR	0.	
3:00	8	10	80	++++++++++++++++
3:30	10	12	81	++++++++++++++++++++
4:00	9	11	80	++++++++++++++++++
4:30	10	12	81	++++++++++++++++++++
5:00	0	ERR	0.	
5:30	0	ERR	0.	
6:00	0	ERR	0.	
6:30	0	ERR	0.	
7:00	10	11	87	++++++++++++++++++++
7:30	7	7	99	++++++++++++++
8:00	9	11	82	++++++++++++++++++
8:30	9	11	81	++++++++++++++++++
9:00	10	12	81	++++++++++++++++++++
9:30	0	ERR	0.	
10:00	10	12	81	++++++++++++++++++++
10:30	9	11	81	++++++++++++++++++
11:00	10	12	82	++++++++++++++++++++
11:30	9	11	80	++++++++++++++++++
12:00	10	12	82	++++++++++++++++++++
12:30	9	11	81	++++++++++++++++++
13:00	11	13	88	++++++++++++++++++++++
13:30	7	7	99	++++++++++++++
14:00	9	11	84	++++++++++++++++++
14:30	11	13	82	++++++++++++++++++++++
15:00	9	11	81	++++++++++++++++++
15:30	11	13	82	++++++++++++++++++++++
16:00	9	11	81	++++++++++++++++++
16:30	10	12	82	++++++++++++++++++++
17:00	10	12	82	++++++++++++++++++++
17:30	9	11	81	++++++++++++++++++
18:00	10	12	82	++++++++++++++++++++
18:30	9	11	81	++++++++++++++++++
19:00	10	12	82	++++++++++++++++++++
19:30	9	11	81	++++++++++++++++++
20:00	10	12	81	++++++++++++++++++++
20:30	9	11	81	++++++++++++++++++
21:00	10	11	87	++++++++++++++++++++
21:30	8	8	99	++++++++++++++++
22:00	8	10	82	++++++++++++++++
22:30	10	12	81	++++++++++++++++++++
23:00	9	11	81	++++++++++++++++++
23:30	10	12	81	++++++++++++++++++++
24:00	9	11	81	++++++++++++++++++

182 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
3 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	10	11	87	++++++++++++++++++++
1:00	0	ERR	0	.
1:30	0	ERR	0	.
2:00	9	11	82	++++++++++++++++++
2:30	9	11	81	++++++++++++++++++
3:00	10	12	81	++++++++++++++++++++
3:30	9	11	80	++++++++++++++++++
4:00	10	12	81	++++++++++++++++++++
4:30	9	11	80	++++++++++++++++++
5:00	9	11	81	++++++++++++++++++
5:30	9	11	81	++++++++++++++++++
6:00	9	11	80	++++++++++++++++++
6:30	10	12	81	++++++++++++++++++++
7:00	9	10	87	++++++++++++++++++
7:30	8	8	99	++++++++++++++++
8:00	8	10	82	++++++++++++++++
8:30	9	11	81	++++++++++++++++++
9:00	10	12	81	++++++++++++++++++++
9:30	9	11	81	++++++++++++++++++
10:00	10	12	82	++++++++++++++++++++
10:30	9	11	81	++++++++++++++++++
11:00	10	12	82	++++++++++++++++++++
11:30	9	11	81	++++++++++++++++++
12:00	10	12	82	++++++++++++++++++++
12:30	9	11	81	++++++++++++++++++
13:00	11	13	87	++++++++++++++++++++++++
13:30	6	6	99	++++++++++++
14:00	10	12	83	++++++++++++++++++++
14:30	9	11	81	++++++++++++++++++
15:00	11	13	82	++++++++++++++++++++++++
15:30	9	11	81	++++++++++++++++++
16:00	10	12	82	++++++++++++++++++++
16:30	9	11	81	++++++++++++++++++
17:00	10	12	82	++++++++++++++++++++
17:30	9	11	81	++++++++++++++++++
18:00	10	12	82	++++++++++++++++++++
18:30	9	11	81	++++++++++++++++++
19:00	9	11	81	++++++++++++++++++
19:30	9	11	81	++++++++++++++++++
20:00	10	12	81	++++++++++++++++++++
20:30	9	11	81	++++++++++++++++++
21:00	10	11	87	++++++++++++++++++++
21:30	8	8	99	++++++++++++++++
22:00	9	11	83	++++++++++++++++++
22:30	9	11	81	++++++++++++++++++
23:00	10	12	82	++++++++++++++++++++
23:30	9	11	81	++++++++++++++++++
24:00	9	11	81	++++++++++++++++++

214 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
4 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++++++++++++++
1:00	9	10	87	++++++++++++++++++++
1:30	8	8	99	++++++++++++++++++
2:00	8	10	82	++++++++++++++++++
2:30	10	12	82	++++++++++++++++++++++
3:00	9	11	81	++++++++++++++++++++
3:30	9	11	81	++++++++++++++++++++
4:00	9	11	81	++++++++++++++++++++
4:30	9	11	81	++++++++++++++++++++
5:00	10	12	81	++++++++++++++++++++++
5:30	9	11	81	++++++++++++++++++++
6:00	9	11	81	++++++++++++++++++++
6:30	9	11	80	++++++++++++++++++++
7:00	9	10	87	++++++++++++++++++++
7:30	8	8	99	++++++++++++++++++
8:00	8	10	82	++++++++++++++++++
8:30	10	12	82	++++++++++++++++++++++
9:00	9	11	81	++++++++++++++++++++
9:30	9	11	81	++++++++++++++++++++
10:00	0	ERR	0.	
10:30	0	ERR	0.	
11:00	0	ERR	0.	
11:30	0	ERR	0.	
12:00	0	ERR	0.	
12:30	0	ERR	0.	
13:00	0	ERR	0.	
13:30	0	ERR	0.	
14:00	0	ERR	0.	
14:30	10	12	82	++++++++++++++++++++++
15:00	9	11	81	++++++++++++++++++++
15:30	9	11	81	++++++++++++++++++++
16:00	9	11	81	++++++++++++++++++++
16:30	9	11	81	++++++++++++++++++++
17:00	10	12	83	+++++++++++++++++++++++
17:30	9	11	81	++++++++++++++++++++
18:00	10	12	82	++++++++++++++++++++++
18:30	9	11	81	++++++++++++++++++++
19:00	10	12	81	++++++++++++++++++++++
19:30	9	11	81	++++++++++++++++++++
20:00	9	11	81	++++++++++++++++++++
20:30	10	12	81	++++++++++++++++++++++
21:00	9	10	87	++++++++++++++++++++
21:30	8	8	99	++++++++++++++++++
22:00	8	10	82	++++++++++++++++++
22:30	9	11	81	++++++++++++++++++++
23:00	9	11	81	++++++++++++++++++++
23:30	8	10	81	++++++++++++++++++
24:00	0	ERR	0.	

172 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
5 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	81	++++++++++++++++++++
1:00	0	ERR	0	.
1:30	0	ERR	0	.
2:00	8	10	82	++++++++++++++++++
2:30	10	12	82	++++++++++++++++++++
3:00	9	11	81	++++++++++++++++++++
3:30	10	12	81	++++++++++++++++++++
4:00	9	11	80	++++++++++++++++++++
4:30	9	11	80	++++++++++++++++++++
5:00	10	12	81	++++++++++++++++++++
5:30	11	13	86	++++++++++++++++++++++++
6:00	11	13	85	++++++++++++++++++++++++
6:30	10	12	84	++++++++++++++++++++
7:00	9	10	88	++++++++++++++++++++
7:30	8	8	99	++++++++++++++++++
8:00	8	10	82	++++++++++++++++++
8:30	9	11	81	++++++++++++++++++++
9:00	10	12	81	++++++++++++++++++++
9:30	9	11	81	++++++++++++++++++++
10:00	9	11	81	++++++++++++++++++++
10:30	9	11	81	++++++++++++++++++++
11:00	9	11	80	++++++++++++++++++++
11:30	10	12	81	++++++++++++++++++++
12:00	0	ERR	0	.
12:30	10	12	81	++++++++++++++++++++
13:00	9	10	87	++++++++++++++++++++
13:30	8	8	99	++++++++++++++++++
14:00	9	11	82	++++++++++++++++++++
14:30	9	11	81	++++++++++++++++++++
15:00	10	12	81	++++++++++++++++++++
15:30	9	11	81	++++++++++++++++++++
16:00	11	13	83	++++++++++++++++++++++++
16:30	11	13	84	++++++++++++++++++++++++
17:00	12	14	84	++++++++++++++++++++++++++++
17:30	10	12	82	++++++++++++++++++++
18:00	11	13	82	++++++++++++++++++++++++
18:30	10	12	81	++++++++++++++++++++
19:00	11	13	82	++++++++++++++++++++++++
19:30	9	11	80	++++++++++++++++++++
20:00	9	11	81	++++++++++++++++++++
20:30	10	12	81	++++++++++++++++++++
21:00	10	11	87	++++++++++++++++++++
21:30	9	9	98	++++++++++++++++++++
22:00	9	11	82	++++++++++++++++++++
22:30	9	11	80	++++++++++++++++++++
23:00	10	13	80	++++++++++++++++++++++++
23:30	9	11	80	++++++++++++++++++++
24:00	0	ERR	0	.

210 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
6 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	9	11	79	++++++++++++++++++++
1:00	0	ERR	0	.
1:30	0	ERR	0	.
2:00	8	10	81	++++++++++++++++++
2:30	9	11	80	++++++++++++++++++++
3:00	10	13	80	++++++++++++++++++++++
3:30	9	11	80	++++++++++++++++++++
4:00	9	11	80	++++++++++++++++++++
4:30	10	12	81	++++++++++++++++++++++
5:00	9	11	80	++++++++++++++++++++
5:30	10	12	85	++++++++++++++++++++++
6:00	10	12	83	++++++++++++++++++++++
6:30	10	12	81	++++++++++++++++++++++
7:00	9	10	87	+++++++++++++++++++
7:30	0	ERR	0	.
8:00	0	ERR	0	.
8:30	0	ERR	0	.
9:00	0	ERR	0	.
9:30	0	ERR	0	.
10:00	0	ERR	0	.
10:30	0	ERR	0	.
11:00	10	12	81	++++++++++++++++++++++
11:30	9	11	80	++++++++++++++++++++
12:00	10	12	82	++++++++++++++++++++++
12:30	8	10	80	++++++++++++++++++
13:00	10	11	87	+++++++++++++++++++++
13:30	0	ERR	0	.
14:00	8	10	82	++++++++++++++++++
14:30	11	13	82	+++++++++++++++++++++++++
15:00	9	11	81	++++++++++++++++++++
15:30	10	12	82	++++++++++++++++++++++
16:00	9	11	81	++++++++++++++++++++
16:30	10	12	82	++++++++++++++++++++++
17:00	9	11	81	++++++++++++++++++++
17:30	10	12	82	++++++++++++++++++++++
18:00	0	ERR	0	.
18:30	0	ERR	0	.
19:00	0	ERR	0	.
19:30	10	12	81	++++++++++++++++++++++
20:00	0	ERR	0	.
20:30	0	ERR	0	.
21:00	10	11	87	+++++++++++++++++++++
21:30	7	7	99	+++++++++++++++
22:00	9	11	82	++++++++++++++++++++
22:30	9	11	81	++++++++++++++++++++
23:00	9	11	81	++++++++++++++++++++
23:30	10	12	81	++++++++++++++++++++++
24:00	10	12	81	++++++++++++++++++++++

0

155 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
7 DAY

DAILY LOAD PROFILE

Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME ENDING	INT DEMAND	KW	KVA	POWER FACTOR	
0:30	0	ERR	0	.	
1:00	9	10	87	++++++++++++++++++	
1:30	0	ERR	0	.	
2:00	0	ERR	0	.	
2:30	9	11	81	++++++++++++++++++	
3:00	9	11	81	++++++++++++++++++	
3:30	10	12	81	++++++++++++++++++++	
4:00	9	11	81	++++++++++++++++++	
4:30	9	11	81	++++++++++++++++++	
5:00	10	12	81	++++++++++++++++++++	
5:30	9	11	81	++++++++++++++++++	
6:00	9	11	80	++++++++++++++++++	
6:30	10	12	81	++++++++++++++++++++	
7:00	9	10	87	++++++++++++++++++	
7:30	7	7	99	++++++++++++++	
8:00	9	11	82	++++++++++++++++++	
8:30	9	11	81	++++++++++++++++++	
9:00	9	11	81	++++++++++++++++++	
9:30	10	12	81	++++++++++++++++++++	
10:00	9	11	80	++++++++++++++++++	
10:30	9	11	81	++++++++++++++++++	
11:00	10	12	81	++++++++++++++++++++	
11:30	9	11	80	++++++++++++++++++	
12:00	11	13	82	++++++++++++++++++++++	
12:30	9	11	80	++++++++++++++++++	
13:00	10	11	87	++++++++++++++++++++	
13:30	7	7	99	++++++++++++++	
14:00	9	11	82	++++++++++++++++++	
14:30	12	14	83	++++++++++++++++++++++++	
15:00	10	12	82	++++++++++++++++++++	
15:30	11	13	82	++++++++++++++++++++++	
16:00	10	12	81	++++++++++++++++++++	
16:30	11	13	82	++++++++++++++++++++++	
17:00	10	12	81	++++++++++++++++++++	
17:30	11	13	82	++++++++++++++++++++++	
18:00	9	11	80	++++++++++++++++++	
18:30	10	12	81	++++++++++++++++++++	
19:00	9	11	80	++++++++++++++++++	
19:30	9	11	80	++++++++++++++++++	
20:00	11	14	81	++++++++++++++++++++++	
20:30	9	11	80	++++++++++++++++++	
21:00	11	13	86	++++++++++++++++++++++	
21:30	7	7	99	++++++++++++++	
22:00	9	11	81	++++++++++++++++++	
22:30	10	12	81	++++++++++++++++++++	
23:00	9	11	80	++++++++++++++++++	
23:30	10	12	81	++++++++++++++++++++	
24:00	9	11	80	++++++++++++++++++	

0

213 KWH = ENERGY USE THIS DAY

1992 YEAR
Oct. MONTH
8 DAY

DAILY LOAD PROFILE
Ft. Campbell Battery Charger Room
Ft. Campbell, Kentucky

TIME INT ENDING	KW DEMAND	KVA	POWER FACTOR	
0:30	8	10	80	++++++++++++++++++
1:00	11	13	87	++++++++++++++++++++++++
1:30	7	7	99	++++++++++++++
2:00	10	12	82	++++++++++++++++++++
2:30	9	11	80	++++++++++++++++++
3:00	9	11	80	++++++++++++++++++
3:30	10	12	81	++++++++++++++++++++
4:00	9	11	81	++++++++++++++++++
4:30	0	ERR	0	.
5:00	9	11	81	++++++++++++++++++
5:30	9	11	81	++++++++++++++++++
6:00	12	14	85	++++++++++++++++++++++++
6:30	9	11	80	++++++++++++++++++
7:00	10	11	87	++++++++++++++++++++
7:30	6	6	99	++++++++++++
8:00	8	10	82	++++++++++++++++
8:30	0	ERR	0	.
9:00	9	11	81	++++++++++++++++++
9:30	10	12	81	++++++++++++++++++++
10:00	9	11	80	++++++++++++++++++
10:30	9	11	81	++++++++++++++++++
11:00	9	11	81	++++++++++++++++++
11:30	10	12	82	++++++++++++++++++++
12:00	9	11	81	++++++++++++++++++
12:30	9	11	80	++++++++++++++++++
13:00	11	13	87	++++++++++++++++++++++++
13:30	6	6	99	++++++++++++
14:00	14	17	84	++++++++++++++++++++++++++++++
14:30	15	18	83	++++++++++++++++++++++++++++++++
15:00	11	13	83	++++++++++++++++++++++++
15:30	12	14	83	++++++++++++++++++++++++++
16:00	10	12	82	++++++++++++++++++++
16:30	12	15	82	++++++++++++++++++++++++++
17:00	9	11	81	++++++++++++++++++
17:30	10	12	81	++++++++++++++++++++
18:00	11	13	82	++++++++++++++++++++++++
18:30	9	11	81	++++++++++++++++++
19:00	11	13	82	++++++++++++++++++++++++
19:30	9	11	80	++++++++++++++++++
20:00	9	11	80	++++++++++++++++++
20:30	11	14	81	++++++++++++++++++++++++
21:00	10	12	86	++++++++++++++++++++
21:30	7	7	99	++++++++++++++
22:00	10	12	82	++++++++++++++++++++
22:30	9	11	80	++++++++++++++++++
23:00	9	11	80	++++++++++++++++++
23:30	11	14	81	++++++++++++++++++++++++
24:00	9	11	80	++++++++++++++++++

223 KWH = ENERGY USE THIS DAY

Ft. Campbell
Cold Storage Facility
Energy Study

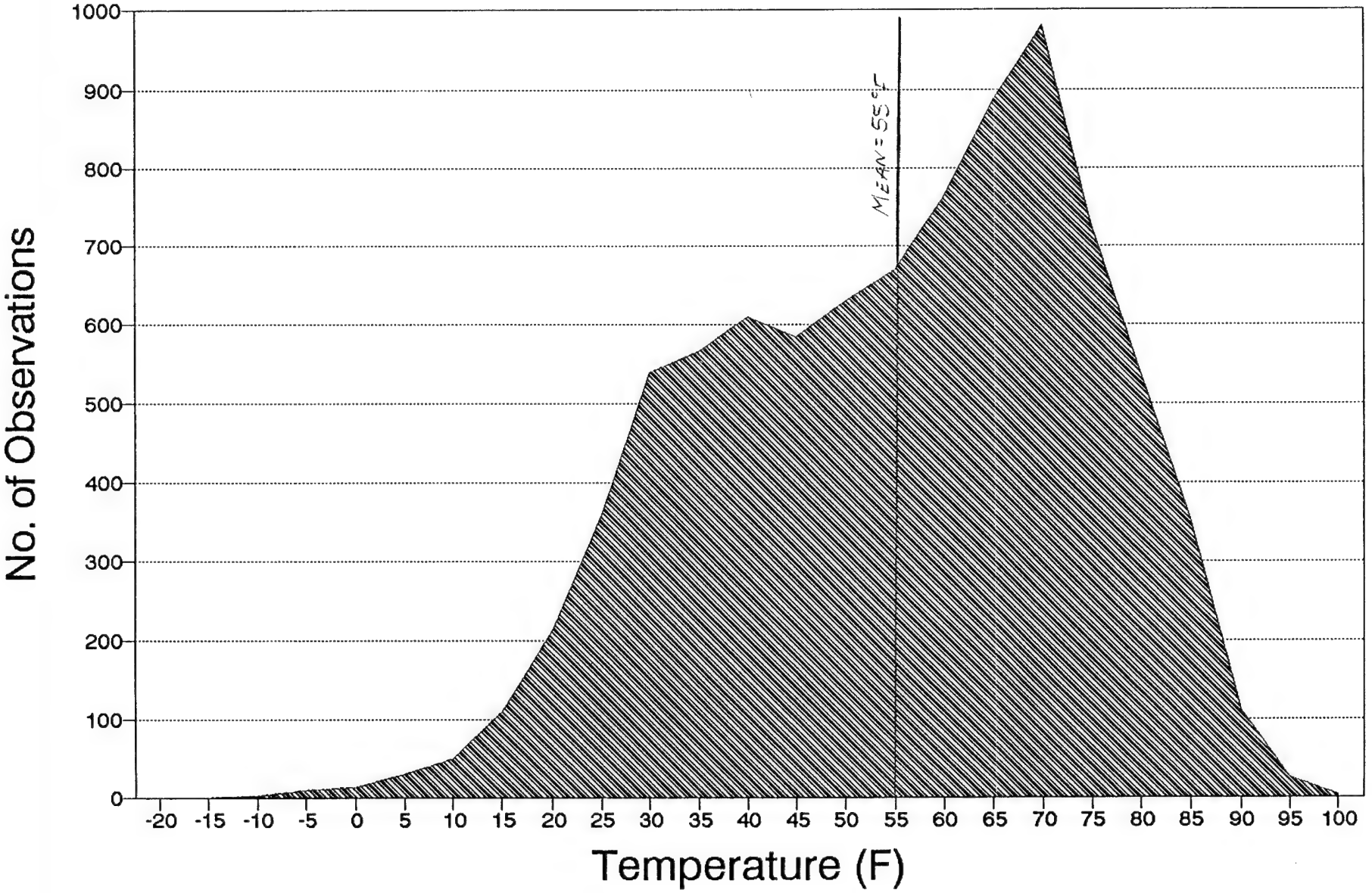
APPENDIX 3

ENERGY CONSERVATION OPPORTUNITY SUPPORTING CALCULATIONS AND COST ESTIMATES

January 1993

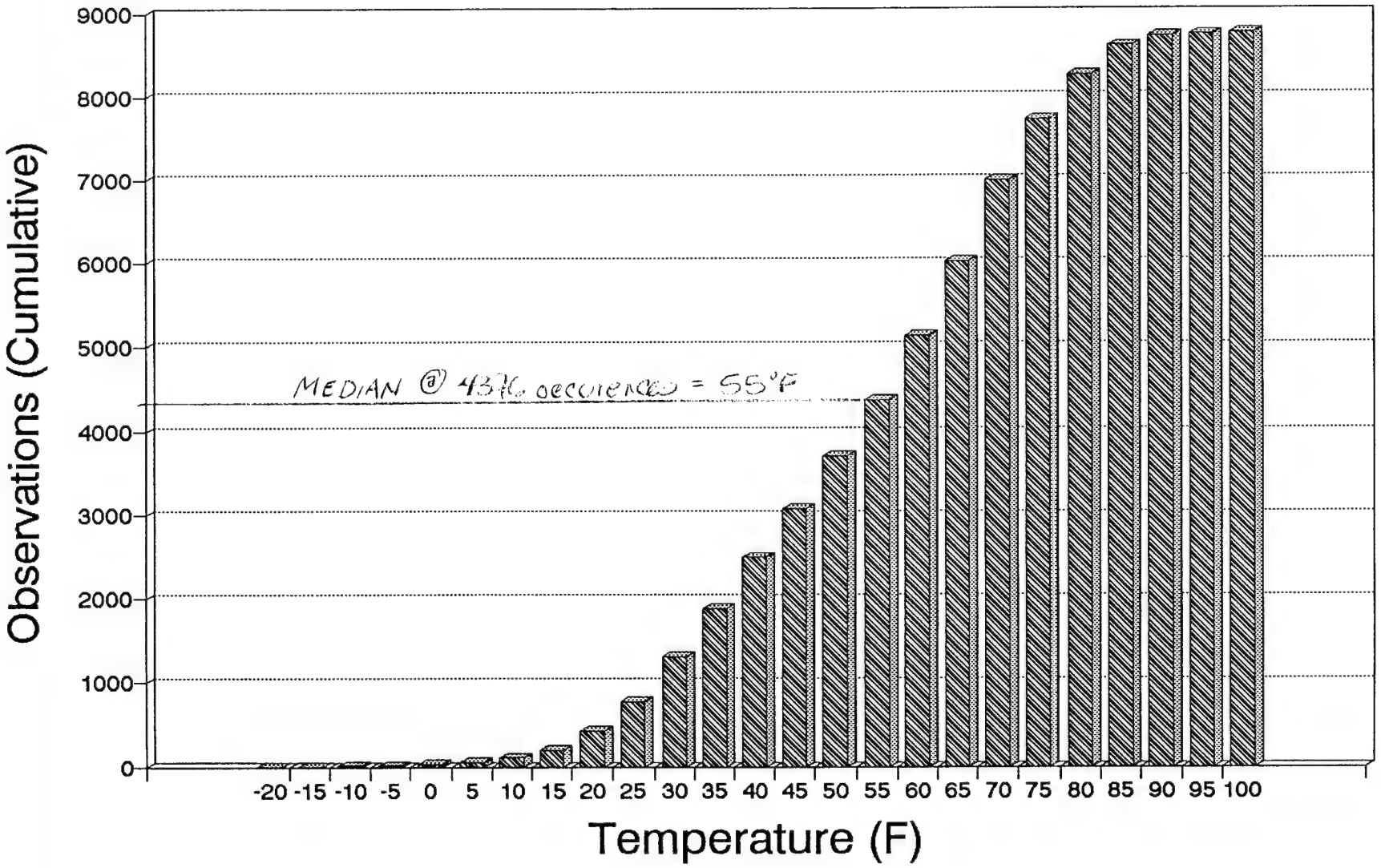
Ft. Campbell KY

Hourly Temperatures



Ft. Campbell KY

Hourly Temperatures



- DEPARTMENT OF THE AIR FORCE MANUAL — AFM 88-29
- DEPARTMENT OF THE ARMY TECHNICAL MANUAL — TM 5-785
- DEPARTMENT OF THE NAVY MANUAL — NAVFAC P-89

Facility Design and Planning

ENGINEERING WEATHER DATA

DEPARTMENTS OF THE AIR FORCE, THE ARMY, AND THE NAVY

1 JULY 1978

State Station	Annual Cooling Degree Days
INDIANA (continued)	
Gary MAP	859
Grissom AFB/Bunker Hill	837
Indiana AAP	1268
Indianapolis/Weir Cook MAP	974
Jefferson Proving Ground	1191
Newport AAP	1094
South Bend/St Joseph Aprt	695
Terre Haute/Hulman Fld	1110
IOWA	
Burlington MAP	994
Cedar Rapids MAP	812
Des Moines MAP	928
Dubuque MAP	606
Fort Dodge MAP	779
Iowa Army Ammunition Plant	994
Iowa City MAP	886
Mason City MAP	580
Sioux City MAP	932
Waterloo MAP	675
KANSAS	
Chanute	1595
Dodge City	1411
Forbes ANGB/Topeka	1430
Fort Leavenworth/Sherman AAF	1292
Fort Riley/Marshall AAF	1503
Goodland/Renner Fld	925
Hutchinson MAP	1626
Kansas City/Fairfax MAP	1420
Kansas Ordnance Plant	1808
McConnell AFB/Wichita	1687
Olathe NAS	1370
Parsons/Tri City	1677
Salina MAP	1627
Schilling Manor	1627
Smoky Hill AF Range	1626
Sunflower Ordnance Works	1370
Topeka/Philip Billard	1361
Wichita	1673
KENTUCKY	
Ashland	1173
Blue Grass Army Depot	1197
Covington	1080
Fort Campbell/Campbell AAF	1472
Fort Knox/Godman AAF	1360
Lexington/Blue Grass Field	1197
Louisville/Standiford Field	1268
Owensboro	1444
Richmond	1197
LOUISIANA	
Alexandria/Esler Field	2193
Barksdale AFB/Shreveport	2451
Baton Rouge/Ryan Aprt	2585
Claibourne	2606
England AFB/Alexandria	2606
Fort Polk/Polk AAF	2666
Hammond ANG Comm Sta	2575
Lafayette	2632
Lake Charles AFS	2739
Lake Charles MAP	2739
Louisiana Ordnance Plant	2451
Monroe MAP	2367

FORT CAMPBELL/CAMPBELL AAF KENTUCKY

LAT 36 40N LONG 87 29W ELEV 571 FT

MEAN FREQUENCY OF OCCURRENCE OF DRY BULB TEMPERATURE (DEGREES F) WITH MEAN COINCIDENT WET BULB TEMPERATURE (DEGREES F) FOR EACH DRY BULB TEMPERATURE RANGE

Temperature Range	MAY					JUNE					JULY					AUGUST					SEPTEMBER					OCTOBER				
	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB
	01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24		
100/104							0		0	76		1		1	79		1		1	77										
95/99		0		0	73		5	1	6	76		9	1	10	79		6	1	7	75		2	0	2	74					
90/94		3	0	3	72		21	5	26	75	0	29	6	35	76		32	5	37	75		9	1	10	74		0		0	73
85/89	0	24	4	28	69	1	51	16	68	73	2	84	27	113	74	0	69	20	89	74		39	5	44	72		5		5	68
80/84	1	48	15	64	68	6	68	38	112	71	13	68	48	129	72	6	69	36	111	71	1	55	15	71	70		23	1	24	66
75/79	5	54	30	89	66	29	52	52	133	69	47	36	70	153	71	34	44	67	145	70	8	52	38	98	68	1	37	8	46	64
70/74	25	43	50	118	64	64	30	65	159	67	101	17	64	182	69	89	22	73	184	68	52	43	62	157	67	4	42	20	66	62
65/69	59	34	59	152	61	76	9	42	127	64	54	4	22	80	64	67	4	31	102	64	56	24	50	130	63	20	45	37	102	59
60/64	57	24	42	123	57	39	3	17	59	59	21	1	8	30	59	33	1	11	45	59	48	10	34	92	58	35	40	47	122	56
55/59	41	11	23	75	52	19	1	4	24	55	8		2	10	55	14		3	17	55	35	4	21	60	54	45	27	41	113	52
50/54	31	5	15	51	48	6	0	1	7	51	2			2	51	4		0	4	50	25	1	9	35	49	40	19	39	98	47
45/49	15	2	8	25	43	0		0	0	45	0			0	48	0			0	44	9	1	3	13	45	38	7	28	73	43
40/44	9		2	11	39	0			0	41											4		1	5	41	33	2	18	53	39
35/39	4		0	4	35																1		0	1	37	22	0	7	29	35
30/34																										10		2	12	31
25/29																										2		0	2	27

FORT CAMPBELL/CAMPBELL AAF KENTUCKY

Temperature Range	NOVEMBER					DECEMBER					JANUARY				
	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB
	01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24		
100/104															
95/99															
90/94															
85/89															
80/84		1		1	68										
75/79		5	1	6	64										
70/74	0	16	2	18	60		1	0	1	62	0	1		1	62
65/69	6	20	9	35	58	2	7	2	11	59	1	5	2	8	59
60/64	10	28	17	55	55	4	17	7	28	55	4	10	7	21	56
55/59	20	39	29	88	51	13	20	17	50	52	8	12	10	30	52
50/54	29	39	36	104	47	16	27	16	59	47	10	20	13	43	46
45/49	34	32	37	103	43	19	28	26	73	42	13	25	19	57	42
40/44	35	28	41	104	38	24	40	34	98	38	20	32	25	77	38
35/39	37	18	30	85	34	34	40	38	112	33	23	35	33	91	33
30/34	35	8	21	64	30	46	33	44	123	29	44	45	50	139	29
25/29	19	5	11	35	25	33	18	34	85	25	42	26	36	104	25
20/24	10	2	4	16	21	31	10	17	58	20	30	15	26	71	20
15/19	4	0	2	6	16	15	3	7	25	16	25	9	12	46	16
10/14	1	0		1	12	7	2	3	12	11	11	6	5	22	11
5/9						2	0	1	3	7	10	4	5	19	6
0/4						1	0	1	2	2	4	2	2	8	1
-5/-1						1	0	0	1	-3	4	0	2	6	-3
-10/-6						0		0	0	-8	1	0	0	1	-8
-15/-11											0		0	0	-12
-20/-16											0		0	0	-18

Temperature Range	FEBRUARY					MARCH					APRIL					ANNUAL TOTAL				
	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB	Obsn Hour Gp			Total Obsn	MCWB
	01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24			01 to 08	09 to 16	17 to 24		
100/104																	2		2	77
95/99																	22	3	25	77
90/94																0	94	17	111	75
85/89							1		1	62		4	0	4	66	3	277	72	352	73
80/84		0		0	61		3	0	3	62		20	5	25	65	27	355	158	540	70
75/79		0	0	0	61		6	2	8	59	1	31	14	46	62	125	317	282	724	68
70/74	0	2	1	3	60	1	13	5	19	58	11	36	25	72	61	347	266	367	980	66
65/69	0	7	3	10	56	4	17	12	33	56	23	37	36	96	58	368	213	305	886	61
60/64	3	12	6	21	54	8	25	19	52	53	37	38	40	115	54	299	209	255	763	56
55/59	7	16	11	34	50	17	28	24	69	49	34	28	36	98	50	261	186	221	668	52
50/54	9	20	16	45	46	24	34	32	90	46	35	22	33	90	46	231	187	210	628	47
45/49	15	27	23	65	41	26	36	34	96	41	35	16	27	78	42	204	174	205	583	42
40/44	24	35	31	90	38	37	37	39	113	38	35	7	15	57	38	221	181	206	608	38
35/39	30	37	37	104	33	42	28	39	109	33	20	2	7	29	34	213	160	191	564	34
30/34	41	32	36	109	29	42	14	27	83	29	7		1	8	30	225	132	181	538	29
25/29	39	17	28	84	25	29	6	12	47	25	1	0		1	27	165	72	121	358	25
20/24	23	10	18	51	20	12	1	3	16	20						106	38	68	212	20
15/19	15	5	7	27	15	4	0	1	5	16						63	17	29	109	16
10/14	9	2	3	14	11	1	0	0	1	11						29	10	11	50	11
5/9	4	1	2	7	6	0	0	0	0	7						16	5	8	29	6
0/4	2	0	1	3	2	0			0	2						7	2	4	13	2
-5/-1	1			1	-4											6	0	2	8	-3
-10/-6																1	0	0	1	-8
-15/-11																0		0	0	-12
-20/-16																0		0	0	-18

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: ROSEN/WICKER

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:4-4MM1
PROJECT LOCATION:	CLARKSVILLE,TENNESSEE
BOX NAME:	C-4 MINI MART PRODUCE
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	38 x 19.5 x 10.3 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	502-798-8895,A. WRIGHT

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	50 DEG.F
INFILTRATION AIR WET BULB TEMP:	44 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	45 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - MED	391	0.040	10 + 0	156.4	3,754
EAST WALL - LT	201	0.040	10 + 0	80.4	1,930
SOUTH WALL - LT	391	0.040	10 + 0	156.4	3,754
WEST WALL - MED	201	0.040	10 + 6	128.6	3,086
ROOF - DK	741	0.050	10 + 20	1,111.5	26,676
FLOOR	741	0.050	10 + 0	370.5	8,892
TOTAL TRANSMISSION LOADS				2,004.0	48,096

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	780.0	BTUH/PERSON	4.0	6,240
MOTORS	0.7	HP	2000.0	BTUH/HP	12.0	16,800
DEFROST	5,600.0	WATTS	100.0	PERCENT	1.0	19,113
LIGHTS	800.0	WATTS	3.4	BTUH/WATT	24.0	65,530
EQUIPMENT	10,430.0	WATTS	3.4	BTUH/WATT	6.0	213,586
TOTAL INTERNAL LOADS						321,268

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Apples	8,561	0	0	0	121	8,681
PRODUCT AND CONT. TOTALS	8,561	0	0	0	121	8,681

INFILTRATION METHOD:	DOOR AREA
INFILTRATION AIR FLOW:	6.9 CFM
HOURS OF INFILTRATION PER DAY:	1.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	50 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	44 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	45 DEG.F
HEIGHT OF DOORWAY:	8.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	13.818 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	12.839 BTU/LB
DENSITY OF INFILTRATION AIR:	0.076 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.077 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	5 %
EFFICIENCY OF PROTECTIVE DEVICE:	80 %
TOTAL INFILTRATION LOAD:	37 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	391	24	156	3,754	0.8
EAST WALL	201	24	80	1,930	0.4
SOUTH WALL	391	24	156	3,754	0.8
WEST WALL	201	24	129	3,087	0.6
ROOF	741	24	1,112	26,676	5.3
FLOOR	741	24	371	8,892	1.8
PEOPLE	2	4	260	6,240	1.3
MOTORS	1	12	700	16,800	3.4
DEFROST WATTS	5,600	1	796	19,113	3.8
LIGHTS	800	24	2,730	65,530	13.1
EQUIPMENT	10,430	6	8,899	213,586	42.8
Apples	10,020	48	362	8,681	1.7
INFILTRATION	7	1	2	37	0.0
COMPRESSOR RUN-TIME	0	20	3,151	75,617	15.2
SAFETY LOAD	10	24	1,890	45,370	9.1
TOTAL BOX LOADS			20,795	499,069	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	2,666	2,004	48,096	9.6
INTERNAL		13,386	321,268	64.4
PRODUCT AND CONTAINER	10,020	362	8,681	1.7
INFILTRATION	7	2	37	0.0
COMPRESSOR RUN-TIME	20	3,151	75,617	15.2
SAFETY LOAD	10	1,890	45,370	9.1
TOTAL BOX LOADS		20,795	499,069	100.0

TOTAL REFRIGERATED AREA:	741	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	7,632	CUBIC FEET
TOTAL ENVELOPE AREA:	2,666	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	9,840	POUNDS
TOTAL WEIGHT OF CONTAINERS:	180	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	13.5	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	427.6	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	499,069.2	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	1.7	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	20,794.5	BTUH

********** REFRIGERATION SYSTEM QUOTATION **********

PROJECT NAME:	FORT CAMPBELL	COMMENT:	EXISTING FACILITY
CLIENT NAME:	US ARMY CORPS OF ENG.	BOX NAME:	NORTH STORAGE STAGING
STREET ADDRESS:	LOUISVILLE, DISTRICT	BOX DIMENSION:	83.9 x 24 x 10.7 FEET
CLIENT CITY:	CLARKSVILLE, TN.	PROJ LOCATION:	NASHVILLE, TENNESSEE
CLIENT PHONE:	UNK	DATE:	10-13-92

REFRIGERATED LOAD SUMMARY:

TOTAL REFRIGERATED AREA:	2,014	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	21,550	CUBIC FEET
TOTAL ENVELOPE AREA:	4,028	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	0	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
REQUIRED 24 HR LOAD:	29,072,506.8	BTU
REQUIRED TONNAGE (1 HR RUNTIME):	100.9	TONS
REQUIRED CAPACITY (1 HR RUNTIME):	1,211,354.4	BTU

EQUIPMENT SUMMARY:

CONDENSING UNIT		EVAPORATOR COIL		
COND MANUF:	KRACK	COIL MANUF:	BOHN	
MODEL:		MODEL:		
NO.OF CONDS.UNITS:	1	NUMBER OF COILS:	1	
PER UNIT NET PRICE:	$0	PER UNIT NET PRICE:	$0	
REFRIGERANT TYPE:		RATED FLOW:	0	CFM
COMP MANUF:	-	COIL AIR THROW:	0	FT
COMP MODEL:	-	FINS PER INCH:	0	
HORSEPOWER:	0 HP	COIL ROWS:	0	
COMP COOLING:		DEFROST WATTS:	0	WATTS

SUCTION TEMPERATURE	60.0	DEG F
ACTUAL COIL TD:	0.0	DEG F
BOX TEMPERATURE:	60.0	DEG F
AMBIENT TEMP:	97.0	DEG F
HOURS OF OPERATION:	1	HOURS
ACTUAL SYSTEM CAPACITY:	0	BTUH

TOTAL COND. UNIT + UNIT COOLER PRICE: $0

COMPLETE SYSTEM PRICE: $0

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:MMER9
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	MINI MART EGG ROOM
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	19.5 x 12.5 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	50 DEG.F
INFILTRATION AIR WET BULB TEMP:	44 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	44 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	131	0.040	11 + 0	57.6	1,382
EAST WALL - LT	205	0.040	11 + 0	90.2	2,165
SOUTH WALL - MED	131	0.040	11 + 4	78.6	1,886
WEST WALL - MED	205	0.040	11 + 6	139.4	3,346
ROOF - DK	156	0.050	11 + 20	241.8	5,803
FLOOR	244	0.050	11 + 0	134.2	3,221
TOTAL TRANSMISSION LOADS				742.1	17,810

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	3.0	PEOPLE	780.0	BTUH/PERSON	8.0	18,720
MOTORS	0.2	HP	2000.0	BTUH/HP	14.0	5,600
LIGHTS	243.8	WATTS	3.4	BTUH/WATT	24.0	19,966
EQUIPMENT	1,380.0	WATTS	3.4	BTUH/WATT	6.0	28,260
TOTAL INTERNAL LOADS						72,546

INFILTRATION METHOD:	DOOR AREA	
INFILTRATION AIR FLOW:	6.3	CFM
HOURS OF INFILTRATION PER DAY:	1.00	HR
INFILTRATION AIR DRY BULB TEMPERATURE:	50	DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	44	DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	44	DEG.F
HEIGHT OF DOORWAY:	8.0	FEET
WIDTH OF DOORWAY:	5.0	FEET
ENTHALPY OF INFILTRATION AIR:	13.818	BTU/LB
ENTHALPY OF REFRIGERATED AIR:	12.521	BTU/LB
DENSITY OF INFILTRATION AIR:	0.076	LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.077	LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	5	%
EFFICIENCY OF PROTECTIVE DEVICE:	85	%
TOTAL INFILTRATION LOAD:	41	BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	131	24	58	1,383	1.2
EAST WALL	205	24	90	2,165	1.8
SOUTH WALL	131	24	79	1,886	1.6
WEST WALL	205	24	139	3,346	2.8
ROOF	156	24	242	5,803	4.9
FLOOR	244	24	134	3,221	2.7
PEOPLE	3	8	780	18,720	15.7
MOTORS	0	14	233	5,600	4.7
LIGHTS	244	24	832	19,966	16.7
EQUIPMENT	1,380	6	1,177	28,260	23.7
Butter	4,920	48	0	0	0.0
INFILTRATION	6	1	2	41	0.0
COMPRESSOR RUN-TIME	0	20	753	18,079	15.2
SAFETY LOAD	10	24	452	10,848	9.1
TOTAL BOX LOADS			4,972	119,323	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	1,072	742	17,810	14.9
INTERNAL		3,023	72,546	60.8
PRODUCT AND CONTAINER	0	0	0	0.0
INFILTRATION	6	2	41	0.0
COMPRESSOR RUN-TIME	20	753	18,079	15.2
SAFETY LOAD	10	452	10,848	9.1
TOTAL BOX LOADS		4,972	119,323	100.0

TOTAL REFRIGERATED AREA:	244	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	2,562	CUBIC FEET
TOTAL ENVELOPE AREA:	1,072	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	4,800	POUNDS
TOTAL WEIGHT OF CONTAINERS:	120	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	20.2	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	588.9	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	119,323.1	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	0.4	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	4,971.8	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:SFRE11
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	Mini Mart Freezer
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	39.5 x 20.7 x 9.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	0 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - MED	375	0.040	55 + 0	825.0	19,800
EAST WALL - MED	197	0.040	55 + 0	433.4	10,402
SOUTH WALL - LT	375	0.040	55 + 0	825.0	19,800
WEST WALL - LT	197	0.040	55 + 0	433.4	10,402
ROOF - DK	779	0.120	55 + 20	7,011.0	168,264
TOTAL TRANSMISSION LOADS				9,522.9	228,549

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	1300.0	BTUH/PERSON	2.0	5,200
MOTORS	2.0	HP	2000.0	BTUH/HP	20.0	80,000
DEFROST	5,200.0	WATTS	100.0	PERCENT	1.0	17,748
LIGHTS	1,400.0	WATTS	3.4	BTUH/WATT	24.0	114,677
TOTAL INTERNAL LOADS						217,624

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Beef Sirloin	8	192	25	0	2,693	2,918
PRODUCT AND CONT. TOTALS	8	192	25	0	2,693	2,918

INFILTRATION METHOD:	DOOR AREA	
INFILTRATION AIR FLOW:	31.4	CFM
HOURS OF INFILTRATION PER DAY:	1.00	HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55	DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55	DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	0	DEG.F
HEIGHT OF DOORWAY:	5.0	FEET
WIDTH OF DOORWAY:	10.0	FEET
ENTHALPY OF INFILTRATION AIR:	18.172	BTU/LB
ENTHALPY OF REFRIGERATED AIR:	0.250	BTU/LB
DENSITY OF INFILTRATION AIR:	0.075	LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.084	LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	5	%
EFFICIENCY OF PROTECTIVE DEVICE:	80	%
TOTAL INFILTRATION LOAD:	2,491	BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	375	24	825	19,800	3.3
EAST WALL	197	24	433	10,402	1.7
SOUTH WALL	375	24	825	19,800	3.3
WEST WALL	197	24	433	10,402	1.7
ROOF	779	24	7,011	168,264	28.2
PEOPLE	2	2	217	5,200	0.9
MOTORS	2	20	3,333	80,000	13.4
DEFROST WATTS	5,200	1	739	17,748	3.0
LIGHTS	1,400	24	4,778	114,677	19.2
Beef Sirloin Cut, c	101	10	122	2,918	0.5
INFILTRATION	31	1	104	2,491	0.4
COMPRESSOR RUN-TIME	0	20	3,763	90,316	15.2
SAFETY LOAD	10	24	2,258	54,190	9.1
TOTAL BOX LOADS			24,837	596,088	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	2,741	9,523	228,549	38.3
INTERNAL		9,068	217,624	36.5
PRODUCT AND CONTAINER	101	122	2,918	0.5
INFILTRATION	31	104	2,491	0.4
COMPRESSOR RUN-TIME	20	3,763	90,316	15.2
SAFETY LOAD	10	2,258	54,190	9.1
TOTAL BOX LOADS		24,837	596,088	100.0

TOTAL REFRIGERATED AREA:	818	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	7,771	CUBIC FEET
TOTAL ENVELOPE AREA:	2,741	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	1	POUNDS
TOTAL WEIGHT OF CONTAINERS:	100	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	0.1	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	395.2	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	596,088.2	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	2.1	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	24,837.0	BTUH

********** REFRIGERATION SYSTEM QUOTATION **********

PROJECT NAME:	FORT CAMPBELL	COMMENT:	EXISTING FACILITY
CLIENT NAME:	US ARMY CORPS OF ENG.	BOX NAME:	NORTH STORAGE STAGING
STREET ADDRESS:	LOUISVILLE, DISTRICT	BOX DIMENSION:	83.9 x 24 x 10.7 FEET
CLIENT CITY:	CLARKSVILLE, TN.	PROJ LOCATION:	NASHVILLE, TENNESSEE
CLIENT PHONE:	UNK	DATE:	10-13-92

REFRIGERATED LOAD SUMMARY:

TOTAL REFRIGERATED AREA:	2,014	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	21,550	CUBIC FEET
TOTAL ENVELOPE AREA:	4,028	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	0	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
REQUIRED 24 HR LOAD:	29,072,506.8	BTU
REQUIRED TONNAGE (1 HR RUNTIME):	100.9	TONS
REQUIRED CAPACITY (1 HR RUNTIME):	1,211,354.4	BTU

EQUIPMENT SUMMARY:

CONDENSING UNIT		EVAPORATOR COIL		
COND MANUF:	KRACK	COIL MANUF:	BOHN	
MODEL:		MODEL:		
NO.OF CONDS.UNITS:	1	NUMBER OF COILS:	1	
PER UNIT NET PRICE:	$0	PER UNIT NET PRICE:	$0	
REFRIGERANT TYPE:		RATED FLOW:	0	CFM
COMP MANUF:	-	COIL AIR THROW:	0	FT
COMP MODEL:	-	FINS PER INCH:	0	
HORSEPOWER:	0 HP	COIL ROWS:	0	
COMP COOLING:		DEFROST WATTS:	0	WATTS

SUCTION TEMPERATURE	60.0	DEG F
ACTUAL COIL TD:	0.0	DEG F
BOX TEMPERATURE:	60.0	DEG F
AMBIENT TEMP:	97.0	DEG F
HOURS OF OPERATION:	1	HOURS
ACTUAL SYSTEM CAPACITY:	0	BTUH

TOTAL COND. UNIT + UNIT COOLER PRICE: $0

COMPLETE SYSTEM PRICE: $0

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:MM-7
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	MINI MART
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	72 x 41 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	50 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	756	0.040	5 + 0	151.2	3,629
EAST WALL - LT	431	0.040	5 + 0	86.2	2,069
SOUTH WALL - LT	756	0.040	5 + 0	151.2	3,629
WEST WALL - LT	431	0.040	5 + 0	86.2	2,069
ROOF - DK	2,952	0.050	5 + 20	3,690.0	88,560
FLOOR	2,952	0.200	5 + 0	2,952.0	70,848
TOTAL TRANSMISSION LOADS				7,116.6	170,798

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	3.0	PEOPLE	720.0	BTUH/PERSON	8.0	17,280
LIGHTS	2,200.0	WATTS	3.4	BTUH/WATT	24.0	180,206
TOTAL INTERNAL LOADS						197,486

INFILTRATION METHOD:	DOOR AREA
INFILTRATION AIR FLOW:	42.0 CFM
HOURS OF INFILTRATION PER DAY:	6.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	50 DEG.F
HEIGHT OF DOORWAY:	7.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	14.467 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.076 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	25 %
EFFICIENCY OF PROTECTIVE DEVICE:	80 %
TOTAL INFILTRATION LOAD:	4,061 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	756	24	151	3,629	0.7
EAST WALL	431	24	86	2,069	0.4
SOUTH WALL	756	24	151	3,629	0.7
WEST WALL	431	24	86	2,069	0.4
ROOF	2,952	24	3,690	88,560	18.0
FLOOR	2,952	24	2,952	70,848	14.4
PEOPLE	3	8	720	17,280	3.5
LIGHTS	2,200	24	7,509	180,206	36.7
INFILTRATION	42	6	169	4,061	0.8
COMPRESSOR RUN-TIME	0	20	3,103	74,469	15.2
SAFETY LOAD	10	24	1,862	44,681	9.1
TOTAL BOX LOADS			20,479	491,496	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	8,278	7,117	170,798	34.8
INTERNAL		8,229	197,486	40.2
PRODUCT AND CONTAINER	0	0	0	0.0
INFILTRATION	42	169	4,061	0.8
COMPRESSOR RUN-TIME	20	3,103	74,469	15.2
SAFETY LOAD	10	1,862	44,681	9.1
TOTAL BOX LOADS		20,479	491,496	100.0

TOTAL REFRIGERATED AREA:	2,952	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	30,996	CUBIC FEET
TOTAL ENVELOPE AREA:	8,278	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	0	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	0.0	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	1,729.8	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	491,495.8	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	1.7	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	20,479.0	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:MMHW8
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	MINI MART HALLWAY
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	84 x 10.5 x 10.6 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	52 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - MED	111	0.040	3 + 0	13.3	319
EAST WALL - MED	890	0.040	3 + 6	320.4	7,690
SOUTH WALL - LT	111	0.040	3 + 0	13.3	319
WEST WALL - LT	890	0.040	3 + 0	106.8	2,563
ROOF - (LT) DK	882	~~0.030~~ 0.035	3 + 9	317.5	7,620
FLOOR	882	0.200	3 + 0	529.2	12,701
TOTAL TRANSMISSION LOADS				1,300.8	31,220

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	720.0	BTUH/PERSON	2.0	2,880
MOTORS	1.5	HP	2000.0	BTUH/HP	12.0	36,000
LIGHTS	1,200.0	WATTS	3.4	BTUH/WATT	24.0	98,294
EQUIPMENT	3,300.0	WATTS	3.4	BTUH/WATT	12.0	135,155
TOTAL INTERNAL LOADS						272,329

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Potatoes, mai	66,010	0	0	0	27	66,037
PRODUCT AND CONT. TOTALS	66,010	0	0	0	27	66,037

INFILTRATION METHOD: DOOR AREA

INFILTRATION AIR FLOW:	12.6 CFM
HOURS OF INFILTRATION PER DAY:	3.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	52 DEG.F
HEIGHT OF DOORWAY:	7.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	15.140 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.076 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	12 %
EFFICIENCY OF PROTECTIVE DEVICE:	85 %
TOTAL INFILTRATION LOAD:	495 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	111	24	13	320	0.1
EAST WALL	890	24	320	7,690	1.6
SOUTH WALL	111	24	13	320	0.1
WEST WALL	890	24	107	2,563	0.5
ROOF	882	24	318	7,620	1.6
FLOOR	882	24	529	12,701	2.6
PEOPLE	2	2	120	2,880	0.6
MOTORS	2	12	1,500	36,000	7.4
LIGHTS	1,200	24	4,096	98,294	20.1
EQUIPMENT	3,300	12	5,631	135,155	27.7
Potatoes, main crop	7,007	48	2,752	66,037	13.5
INFILTRATION	13	3	21	495	0.1
COMPRESSOR RUN-TIME	0	20	3,084	74,016	15.2
SAFETY LOAD	10	24	1,850	44,410	9.1
TOTAL BOX LOADS			20,354	488,507	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	3,766	1,301	31,220	6.4
INTERNAL		11,347	272,329	55.7
PRODUCT AND CONTAINER	7,007	2,752	66,037	13.5
INFILTRATION	13	21	495	0.1
COMPRESSOR RUN-TIME	20	3,084	74,016	15.2
SAFETY LOAD	10	1,850	44,410	9.1
TOTAL BOX LOADS		20,354	488,507	100.0

TOTAL REFRIGERATED AREA:	882	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	9,349	CUBIC FEET
TOTAL ENVELOPE AREA:	3,766	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	7,000	POUNDS
TOTAL WEIGHT OF CONTAINERS:	7	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	7.9	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	520.0	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	488,507.4	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	1.7	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	20,354.5	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:C-1-2
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	SHORTENING AND OLEO ROOM
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	23 x 19.7 x 10.3 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	42 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - MED	237	0.040	13 + 0	123.2	2,957
EAST WALL - MED	203	0.040	13 + 6	154.3	3,703
SOUTH WALL - MED	237	0.040	13 + 0	123.2	2,957
WEST WALL - LT	203	0.040	13 + 0	105.6	2,534
ROOF - DK	453	0.050	13 + 20	747.5	17,940
FLOOR	453	0.050	13 + 0	294.5	7,068
TOTAL TRANSMISSION LOADS				1,548.2	37,158

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	720.0	BTUH/PERSON	4.0	5,760
MOTORS	1.2	HP	2000.0	BTUH/HP	4.0	9,600
LIGHTS	600.0	WATTS	3.4	BTUH/WATT	24.0	49,147
EQUIPMENT	4,080.0	WATTS	3.4	BTUH/WATT	6.0	83,550
TOTAL INTERNAL LOADS						148,057

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Butter	93,312	0	0	0	0	93,312
PRODUCT AND CONT. TOTALS	93,312	0	0	0	0	93,312

INFILTRATION METHOD: DOOR AREA

INFILTRATION AIR FLOW:	12.6 CFM
HOURS OF INFILTRATION PER DAY:	1.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	42 DEG.F
HEIGHT OF DOORWAY:	7.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	11.894 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.077 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	5 %
EFFICIENCY OF PROTECTIVE DEVICE:	80 %
TOTAL INFILTRATION LOAD:	347 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	237	24	123	2,958	0.8
EAST WALL	203	24	154	3,703	1.0
SOUTH WALL	237	24	123	2,958	0.8
WEST WALL	203	24	106	2,533	0.7
ROOF	453	24	747	17,939	4.9
FLOOR	453	24	294	7,067	1.9
PEOPLE	2	4	240	5,760	1.6
MOTORS	1	4	400	9,600	2.6
LIGHTS	600	24	2,048	49,147	13.4
EQUIPMENT	4,080	6	3,481	83,550	22.7
Butter	28,800	48	3,888	93,312	25.3
INFILTRATION	13	1	14	347	0.1
COMPRESSOR RUN-TIME	0	20	2,324	55,775	15.2
SAFETY LOAD	10	24	1,394	33,465	9.1
TOTAL BOX LOADS			15,338	368,113	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	1,786	1,548	37,158	10.1
INTERNAL		6,169	148,057	40.2
PRODUCT AND CONTAINER	28,800	3,888	93,312	25.3
INFILTRATION	13	14	347	0.1
COMPRESSOR RUN-TIME	20	2,324	55,775	15.2
SAFETY LOAD	10	1,394	33,465	9.1
TOTAL BOX LOADS		15,338	368,113	100.0

TOTAL REFRIGERATED AREA:	453	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	4,666	CUBIC FEET
TOTAL ENVELOPE AREA:	1,786	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	28,800	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	63.6	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	354.4	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	368,113.5	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	1.3	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	15,338.1	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:EC-33
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	EGG ROOM EC-3
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	44 x 30 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	56 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	56 DEG.F
INFILTRATION AIR WET BULB TEMP:	56 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	56 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	315	0.040	0 + 0	0.0	0
EAST WALL - MED	462	0.040	0 + 0	0.0	0
SOUTH WALL - LT	315	0.040	0 + 0	0.0	0
WEST WALL - LT	462	0.040	0 + 0	0.0	0
ROOF - DK	1,320	0.050	0 + 20	1,320.0	31,680
TOTAL TRANSMISSION LOADS				1,320.0	31,680

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	1.0	PEOPLE	720.0	BTUH/PERSON	2.0	1,440
MOTORS	0.5	HP	2100.0	BTUH/HP	4.0	4,200
LIGHTS	2,000.0	WATTS	3.4	BTUH/WATT	24.0	163,824
EQUIPMENT	2,200.0	WATTS	3.4	BTUH/WATT	6.0	45,052
TOTAL INTERNAL LOADS						214,516

INFILTRATION METHOD:	DOOR AREA	
INFILTRATION AIR FLOW:	0.0	CFM
HOURS OF INFILTRATION PER DAY:	3.00	HR
INFILTRATION AIR DRY BULB TEMPERATURE:	56	DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	56	DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	56	DEG.F
HEIGHT OF DOORWAY:	8.0	FEET
WIDTH OF DOORWAY:	5.0	FEET
ENTHALPY OF INFILTRATION AIR:	18.599	BTU/LB
ENTHALPY OF REFRIGERATED AIR:	16.526	BTU/LB
DENSITY OF INFILTRATION AIR:	0.075	LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.075	LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	12	%
EFFICIENCY OF PROTECTIVE DEVICE:	85	%
TOTAL INFILTRATION LOAD:	0	BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
ROOF	1,320	24	1,320	31,680	9.7
PEOPLE	1	2	60	1,440	0.4
MOTORS	1	4	175	4,200	1.3
LIGHTS	2,000	24	6,826	163,824	50.4
EQUIPMENT	2,200	6	1,877	45,052	13.9
Eggs, shell	23,660	48	0	0	0.0
COMPRESSOR RUN-TIME	0	20	2,052	49,239	15.2
SAFETY LOAD	10	24	1,231	29,543	9.1
TOTAL BOX LOADS			13,541	324,978	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	2,640	1,320	31,680	9.7
INTERNAL		8,938	214,516	66.0
PRODUCT AND CONTAINER	0	0	0	0.0
INFILTRATION	0	0	0	0.0
COMPRESSOR RUN-TIME	20	2,052	49,239	15.2
SAFETY LOAD	10	1,231	29,543	9.1
TOTAL BOX LOADS		13,541	324,978	100.0

TOTAL REFRIGERATED AREA:	1,320	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	13,860	CUBIC FEET
TOTAL ENVELOPE AREA:	2,640	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	23,400	POUNDS
TOTAL WEIGHT OF CONTAINERS:	260	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	17.9	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	1,169.8	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	324,978.2	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	1.1	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	13,540.8	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:ISSRM5
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	ISSUE ROOM
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	82 x 21 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	45 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	861	0.040	10 + 0	344.4	8,266
EAST WALL - MED	221	0.040	10 + 6	141.4	3,394
SOUTH WALL - LT	861	0.040	10 + 0	344.4	8,266
WEST WALL - MED	221	0.040	10 + 6	141.4	3,394
ROOF - DK	1,722	0.050	10 + 20	2,583.0	61,992
FLOOR	1,722	0.050	10 + 0	861.0	20,664
TOTAL TRANSMISSION LOADS				4,415.0	105,961

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	3.0	PEOPLE	600.0	BTUH/PERSON	8.0	14,400
MOTORS	12.0	HP	2000.0	BTUH/HP	12.0	288,000
LIGHTS	1,722.0	WATTS	3.4	BTUH/WATT	24.0	141,052
EQUIPMENT	9,240.0	WATTS	3.4	BTUH/WATT	6.0	189,217
TOTAL INTERNAL LOADS						632,669

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Bread	4,200	0	0	0	0	4,200
Milk, whole p	465	0	0	0	0	465
PRODUCT AND CONT. TOTALS	4,665	0	0	0	0	4,665

INFILTRATION METHOD: DOOR AREA

INFILTRATION AIR FLOW:	24.6	CFM
HOURS OF INFILTRATION PER DAY:	3.00	HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55	DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55	DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	45	DEG.F
HEIGHT OF DOORWAY:	8.0	FEET
WIDTH OF DOORWAY:	5.0	FEET
ENTHALPY OF INFILTRATION AIR:	18.172	BTU/LB
ENTHALPY OF REFRIGERATED AIR:	12.839	BTU/LB
DENSITY OF INFILTRATION AIR:	0.075	LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.077	LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	12	%
EFFICIENCY OF PROTECTIVE DEVICE:	85	%
TOTAL INFILTRATION LOAD:	1,724	BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	861	24	344	8,266	0.8
EAST WALL	221	24	141	3,395	0.3
SOUTH WALL	861	24	344	8,266	0.8
WEST WALL	221	24	141	3,395	0.3
ROOF	1,722	24	2,583	61,992	6.3
FLOOR	1,722	24	861	20,664	2.1
PEOPLE	3	8	600	14,400	1.5
MOTORS	12	12	12,000	288,000	29.3
LIGHTS	1,722	24	5,877	141,052	14.3
EQUIPMENT	9,240	6	7,884	189,217	19.2
Bread	400	48	175	4,200	0.4
Milk, whole past. G	100	48	19	465	0.0
INFILTRATION	25	3	72	1,724	0.2
COMPRESSOR RUN-TIME	0	20	6,208	149,004	15.2
SAFETY LOAD	10	24	3,725	89,402	9.1
TOTAL BOX LOADS			40,976	983,426	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	5,608	4,415	105,961	10.8
INTERNAL		26,361	632,669	64.3
PRODUCT AND CONTAINER	500	194	4,665	0.5
INFILTRATION	25	72	1,724	0.2
COMPRESSOR RUN-TIME	20	6,208	149,004	15.2
SAFETY LOAD	10	3,725	89,402	9.1
TOTAL BOX LOADS		40,976	983,426	100.0

TOTAL REFRIGERATED AREA:	1,722	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	18,081	CUBIC FEET
TOTAL ENVELOPE AREA:	5,608	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	500	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	0.3	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	504.3	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	983,425.8	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	3.4	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	40,976.1	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 10-13-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: WICKER/ROSEN

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:VF213
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	VEGETABLE FREEZER 2
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	44 x 27 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	3 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	50 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	284	0.040	52 + 0	590.7	14,177
EAST WALL - LT	462	0.040	52 + 0	961.0	23,064
SOUTH WALL - LT	284	0.040	52 + 0	590.7	14,177
WEST WALL - LT	462	0.040	52 + 0	961.0	23,064
ROOF - DK	1,188	0.033	52 + 20	2,822.7	67,745
FLOOR	1,188	0.033	52 + 0	2,038.6	48,926
TOTAL TRANSMISSION LOADS				7,962.6	191,102

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	1250.0	BTUH/PERSON	2.0	5,000
MOTORS	0.3	HP	3000.0	BTUH/HP	12.0	10,800
DEFROST	5,200.0	WATTS	100.0	PERCENT	1.0	17,748
LIGHTS	1,200.0	WATTS	3.4	BTUH/WATT	24.0	98,294
EQUIPMENT	5,890.0	WATTS	3.4	BTUH/WATT	1.0	20,103
TOTAL INTERNAL LOADS						151,945

INFILTRATION METHOD:	DOOR AREA	
INFILTRATION AIR FLOW:	55.4	CFM
HOURS OF INFILTRATION PER DAY:	3.00	HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55	DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55	DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	3	DEG.F
HEIGHT OF DOORWAY:	8.0	FEET
WIDTH OF DOORWAY:	5.0	FEET
ENTHALPY OF INFILTRATION AIR:	18.172	BTU/LB
ENTHALPY OF REFRIGERATED AIR:	0.964	BTU/LB
DENSITY OF INFILTRATION AIR:	0.075	LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.084	LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	12	%
EFFICIENCY OF PROTECTIVE DEVICE:	85	%
TOTAL INFILTRATION LOAD:	12,672	BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	284	24	591	14,177	3.0
EAST WALL	462	24	961	23,063	4.9
SOUTH WALL	284	24	591	14,177	3.0
WEST WALL	462	24	961	23,063	4.9
ROOF	1,188	24	2,823	67,745	14.4
FLOOR	1,188	24	2,039	48,927	10.4
PEOPLE	2	2	208	5,000	1.1
MOTORS	0	12	450	10,800	2.3
DEFROST WATTS	5,200	1	739	17,748	3.8
LIGHTS	1,200	24	4,096	98,294	20.9
EQUIPMENT	5,890	1	838	20,103	4.3
Butter	500	48	0	0	0.0
INFILTRATION	55	3	528	12,672	2.7
COMPRESSOR RUN-TIME	0	20	2,964	71,144	15.2
SAFETY LOAD	10	24	1,779	42,686	9.1
TOTAL BOX LOADS			19,564	469,548	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	3,868	7,963	191,102	40.7
INTERNAL		6,331	151,945	32.4
PRODUCT AND CONTAINER	0	0	0	0.0
INFILTRATION	55	528	12,672	2.7
COMPRESSOR RUN-TIME	20	2,964	71,144	15.2
SAFETY LOAD	10	1,779	42,686	9.1
TOTAL BOX LOADS		19,564	469,548	100.0

TOTAL REFRIGERATED AREA:	1,188	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	12,474	CUBIC FEET
TOTAL ENVELOPE AREA:	3,868	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	500	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	0.4	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	728.7	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	469,547.8	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	1.6	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	19,564.5	BTUH

** OGDEN **		PROJECT NAME:	FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.		CLIENT NAME:	US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933		DATE:	12-28-92
REFRIGERATION BOX LOADS PROGRAM		DESIGNER:	Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:VF112
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	VF-1,NORTH FREEZER
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	40 x 23 x 10.2 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	6 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	50 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - MED	408	0.040	49 + 0	799.7	19,193
EAST WALL - LT	235	0.040	49 + 0	460.6	11,054
SOUTH WALL - MED	408	0.040	49 + 0	799.7	19,193
WEST WALL - MED	235	0.040	49 + 6	517.0	12,408
ROOF - DK	920	0.033	49 + 20	2,094.8	50,275
FLOOR	920	0.033	49 + 0	1,487.6	35,702
TOTAL TRANSMISSION LOADS				6,157.8	147,787

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	1250.0	BTUH/PERSON	1.0	2,500
MOTORS	3.0	HP	3000.0	BTUH/HP	12.0	108,000
DEFROST	4,000.0	WATTS	100.0	PERCENT	1.0	13,652
LIGHTS	800.0	WATTS	3.4	BTUH/WATT	24.0	65,530
EQUIPMENT	9,792.0	WATTS	3.4	BTUH/WATT	1.0	33,420
TOTAL INTERNAL LOADS						223,102

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Beans, Lima	3,066	197,400	20,160	0	31,095	251,721
PRODUCT AND CONT. TOTALS	3,066	197,400	20,160	0	31,095	251,721

INFILTRATION METHOD: DOOR AREA

INFILTRATION AIR FLOW:	24.4 CFM
HOURS OF INFILTRATION PER DAY:	1.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	6 DEG.F
HEIGHT OF DOORWAY:	7.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	1.725 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.083 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	5 %
EFFICIENCY OF PROTECTIVE DEVICE:	80 %
TOTAL INFILTRATION LOAD:	1,776 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	408	24	800	19,192	2.3
EAST WALL	235	24	461	11,054	1.3
SOUTH WALL	408	24	800	19,192	2.3
WEST WALL	235	24	517	12,408	1.5
ROOF	920	24	2,095	50,276	6.1
FLOOR	920	24	1,488	35,703	4.3
PEOPLE	2	1	104	2,500	0.3
MOTORS	3	12	4,500	108,000	13.1
DEFROST WATTS	4,000	1	569	13,652	1.7
LIGHTS	800	24	2,730	65,530	8.0
EQUIPMENT	9,792	1	1,393	33,420	4.1
Beans, Lima	7,770	48	10,488	251,721	30.5
INFILTRATION	24	1	74	1,776	0.2
COMPRESSOR RUN-TIME	0	20	5,203	124,877	15.2
SAFETY LOAD	10	24	3,122	74,926	9.1
TOTAL BOX LOADS			34,341	824,189	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	3,126	6,158	147,787	17.9
INTERNAL		9,296	223,102	27.1
PRODUCT AND CONTAINER	7,770	10,488	251,721	30.5
INFILTRATION	24	74	1,776	0.2
COMPRESSOR RUN-TIME	20	5,203	124,877	15.2
SAFETY LOAD	10	3,122	74,926	9.1
TOTAL BOX LOADS		34,341	824,189	100.0

TOTAL REFRIGERATED AREA:	920	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	9,384	CUBIC FEET
TOTAL ENVELOPE AREA:	3,126	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	4,200	POUNDS
TOTAL WEIGHT OF CONTAINERS:	3,570	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	8.4	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	321.5	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	824,188.8	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	2.9	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	34,341.2	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92

REFRIGERATION BOX LOADS PROGRAM — DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:PC210
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	PC-2 VEGETABLE COOLER
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	44 x 23 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	39 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	242	0.040	16 + 0	154.9	3,718
EAST WALL - LT	462	0.040	16 + 0	295.7	7,097
SOUTH WALL - LT	242	0.040	16 + 0	154.9	3,718
WEST WALL - MED	462	0.040	16 + 6	406.6	9,758
ROOF - DK	1,012	0.050	16 + 20	1,821.6	43,718
FLOOR	1,012	0.200	16 + 0	3,238.4	77,722
TOTAL TRANSMISSION LOADS				6,071.4	145,713

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	840.0	BTUH/PERSON	2.0	3,360
MOTORS	12.0	HP	3000.0	BTUH/HP	12.0	432,000
LIGHTS	1,200.0	WATTS	3.4	BTUH/WATT	24.0	98,294
EQUIPMENT	10,252.0	WATTS	3.4	BTUH/WATT	6.0	209,940
TOTAL INTERNAL LOADS						743,595

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Lettuce, head	169,344	0	0	0	2,533	171,877
PRODUCT AND CONT. TOTALS	169,344	0	0	0	2,533	171,877

INFILTRATION METHOD:	DOOR AREA
INFILTRATION AIR FLOW:	33.3 CFM
HOURS OF INFILTRATION PER DAY:	3.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	39 DEG.F
HEIGHT OF DOORWAY:	7.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	10.972 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.078 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	12 %
EFFICIENCY OF PROTECTIVE DEVICE:	80 %
TOTAL INFILTRATION LOAD:	3,158 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	242	24	155	3,717	0.3
EAST WALL	462	24	296	7,096	0.5
SOUTH WALL	242	24	155	3,717	0.3
WEST WALL	462	24	407	9,757	0.7
ROOF	1,012	24	1,822	43,718	3.1
FLOOR	1,012	24	3,238	77,722	5.5
PEOPLE	2	2	140	3,360	0.2
MOTORS	12	12	18,000	432,000	30.7
LIGHTS	1,200	24	4,096	98,294	7.0
EQUIPMENT	10,252	6	8,748	209,940	14.9
Lettuce, head	17,160	48	7,162	171,877	12.2
INFILTRATION	33	3	132	3,158	0.2
COMPRESSOR RUN-TIME	0	20	8,870	212,868	15.2
SAFETY LOAD	10	24	5,322	127,721	9.1
TOTAL BOX LOADS			58,539	1,404,931	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	3,432	6,071	145,713	10.4
INTERNAL		30,983	743,595	52.9
PRODUCT AND CONTAINER	17,160	7,162	171,877	12.2
INFILTRATION	33	132	3,158	0.2
COMPRESSOR RUN-TIME	20	8,870	212,868	15.2
SAFETY LOAD	10	5,322	127,721	9.1
TOTAL BOX LOADS		58,539	1,404,931	100.0

TOTAL REFRIGERATED AREA:	1,012	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	10,626	CUBIC FEET
TOTAL ENVELOPE AREA:	3,432	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	16,800	POUNDS
TOTAL WEIGHT OF CONTAINERS:	360	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	17.0	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	207.5	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	1,404,931.4	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	4.9	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	58,538.8	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:MF-16
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	MAIN MEAT FREEZER
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	82 x 37 x 10.2 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE, DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE, TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	6 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	60 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - LT	836	0.040	49 + 0	1,638.6	39,326
EAST WALL - MED	377	0.040	49 + 6	829.4	19,906
SOUTH WALL - LT	836	0.040	49 + 0	1,638.6	39,326
WEST WALL - MED	377	0.040	49 + 6	829.4	19,906
ROOF - DK	3,034	0.033	49 + 20	6,908.4	165,802
FLOOR	3,034	0.033	49 + 0	4,906.0	117,744
TOTAL TRANSMISSION LOADS				16,753.6	402,088

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	2.0	PEOPLE	1050.0	BTUH/PERSON	4.0	8,400
MOTORS	8.5	HP	3000.0	BTUH/HP	14.0	357,000
DEFROST	6,600.0	WATTS	100.0	PERCENT	2.0	45,052
LIGHTS	3,600.0	WATTS	3.4	BTUH/WATT	24.0	294,883
EQUIPMENT	15,400.0	WATTS	3.4	BTUH/WATT	6.0	315,361
TOTAL INTERNAL LOADS						1,020,696

PRODUCT DESCRIPTION	COOLING BTU	+ FREEZE BTU	+ SUB-COOL BTU	+ RESPIR BTU	+ CONTAIN BTU	= 24 HR LOAD
Beef Sirloin	27,720	1,680,000	170,940	0	33,768	1,912,428
PRODUCT AND CONT. TOTALS	27,720	1,680,000	170,940	0	33,768	1,912,428

INFILTRATION METHOD:	DOOR AREA
INFILTRATION AIR FLOW:	53.6 CFM
HOURS OF INFILTRATION PER DAY:	3.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	6 DEG.F
HEIGHT OF DOORWAY:	8.0 FEET
WIDTH OF DOORWAY:	5.0 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	1.782 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.083 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	12 %
EFFICIENCY OF PROTECTIVE DEVICE:	85 %
TOTAL INFILTRATION LOAD:	11,674 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	836	24	1,639	39,325	0.9
EAST WALL	377	24	829	19,906	0.5
SOUTH WALL	836	24	1,639	39,325	0.9
WEST WALL	377	24	829	19,906	0.5
ROOF	3,034	24	6,908	165,802	3.8
FLOOR	3,034	24	4,906	117,743	2.7
PEOPLE	2	4	350	8,400	0.2
MOTORS	9	14	14,875	357,000	8.1
DEFROST WATTS	6,600	2	1,877	45,052	1.0
LIGHTS	3,600	24	12,287	294,883	6.7
EQUIPMENT	15,400	6	13,140	315,361	7.1
Beef Sirloin Cut, c	46,200	48	79,685	1,912,428	43.3
INFILTRATION	54	3	486	11,674	0.3
COMPRESSOR RUN-TIME	0	20	27,891	669,377	15.2
SAFETY LOAD	10	24	16,734	401,626	9.1
TOTAL BOX LOADS			184,079	4,417,889	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	8,494	16,754	402,088	9.1
INTERNAL		42,529	1,020,696	23.1
PRODUCT AND CONTAINER	46,200	79,685	1,912,428	43.3
INFILTRATION	54	486	11,674	0.3
COMPRESSOR RUN-TIME	20	27,891	669,377	15.2
SAFETY LOAD	10	16,734	401,626	9.1
TOTAL BOX LOADS		184,079	4,417,889	100.0

TOTAL REFRIGERATED AREA:	3,034	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	30,947	CUBIC FEET
TOTAL ENVELOPE AREA:	8,494	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	42,000	POUNDS
TOTAL WEIGHT OF CONTAINERS:	4,200	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	15.2	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	197.8	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	4,417,888.6	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	15.3	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	184,078.7	BTUH

** OGDEN **	PROJECT NAME: FORT CAMPBELL
ENVIRONMENTAL ENG. DIV.	CLIENT NAME: US ARMY CORPS OF ENG.
KNOXVILLE, TN 37933	DATE: 12-28-92
REFRIGERATION BOX LOADS PROGRAM	DESIGNER: Corry

GENERAL PROJECT INFORMATION:

PROJECT NAME:	FORT CAMPBELL
PROJECT FILE NAME:	K:ICERM4
PROJECT LOCATION:	COLD STORAGE FACILITY
BOX NAME:	CRUSHED ICE ROOM
GENERAL COMMENTS:	EXISTING FACILITY
BOX DIMENSIONS (LxWxH):	24 x 12.5 x 10.5 FEET
CLIENT NAME:	US ARMY CORPS OF ENG.
STREET ADDRESS:	LOUISVILLE DISTRICT
CITY, STATE, ZIP:	CLARKSVILLE,TN.
CLIENT PHONE:	UNK

OUTDOOR DESIGN CONDITIONS:

ALTITUDE:	590 FEET
OUTDOOR DESIGN DRY BULB:	55 DEG.F
OUTDOOR DESIGN WET BULB:	55 DEG.F
INFILTRATION AIR DRY BULB TEMP:	55 DEG.F
INFILTRATION AIR WET BULB TEMP:	55 DEG.F

INDOOR DESIGN CONDITIONS:

REFRIGERATED BOX DRY BULB TEMP:	28 DEG.F
REFRIGERATED BOX REL. HUMIDITY:	10 %
SAFETY FACTOR:	10 %

********** DETAILED BOX LOADS REPORT **********

LOAD DESCRIPTION	AREA (SF)	--U-- FACTOR	TEMP DIFF	HOURLY BTU LOAD	24 BTU LO
NORTH WALL - MED	131	0.040	27 + 0	141.5	3,396
EAST WALL - MED	252	0.040	27 + 0	272.2	6,533
SOUTH WALL - MED	131	0.040	27 + 4	162.4	3,898
WEST WALL - MED	252	0.040	27 + 6	332.6	7,982
ROOF - DK	300	0.050	27 + 20	705.0	16,920
FLOOR	300	0.050	27 + 0	405.0	9,720
TOTAL TRANSMISSION LOADS				2,019.3	48,463

LOAD DESCRIPTION	UNIT QUAN		LOAD FACTOR		OPERATING HOURS	24 HR BTU LOAD
PEOPLE	1.0	PEOPLE	950.0	BTUH/PERSON	1.0	950
MOTORS	0.5	HP	1271.0	BTUH/HP	6.0	3,813
DEFROST	2,400.0	WATTS	100.0	PERCENT	1.0	8,191
LIGHTS	300.0	WATTS	3.4	BTUH/WATT	24.0	24,574
EQUIPMENT	600.0	WATTS	3.4	BTUH/WATT	6.0	12,287
TOTAL INTERNAL LOADS						49,815

INFILTRATION METHOD:	DOOR AREA
INFILTRATION AIR FLOW:	387.6 CFM
HOURS OF INFILTRATION PER DAY:	2.00 HR
INFILTRATION AIR DRY BULB TEMPERATURE:	55 DEG.F
INFILTRATION AIR WET BULB TEMPERATURE:	55 DEG.F
REFRIGERATED BOX AIR TEMPERATURE:	28 DEG.F
HEIGHT OF DOORWAY:	7.7 FEET
WIDTH OF DOORWAY:	5.8 FEET
ENTHALPY OF INFILTRATION AIR:	18.172 BTU/LB
ENTHALPY OF REFRIGERATED AIR:	6.888 BTU/LB
DENSITY OF INFILTRATION AIR:	0.075 LB/CUBIC FT
DENSITY OF REFRIGERATED AIR:	0.080 LB/CUBIC FT
PERCENT OF FULL FLOW THROUGH DOOR:	80 %
EFFICIENCY OF PROTECTIVE DEVICE:	80 %
TOTAL INFILTRATION LOAD:	38,509 BTU/24 HR

********** BOX LOADS SUMMARY REPORT **********

BOX LOAD DESCRIPTIONS	AREA QUAN	OPER HOURS	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
NORTH WALL	131	24	142	3,396	1.9
EAST WALL	252	24	272	6,532	3.6
SOUTH WALL	131	24	162	3,899	2.2
WEST WALL	252	24	333	7,983	4.4
ROOF	300	24	705	16,920	9.4
FLOOR	300	24	405	9,720	5.4
PEOPLE	1	1	40	950	0.5
MOTORS	1	6	159	3,813	2.1
DEFROST WATTS	2,400	1	341	8,191	4.5
LIGHTS	300	24	1,024	24,574	13.6
EQUIPMENT	600	6	512	12,287	6.8
ICE	13,000	48	0	0	0.0
INFILTRATION	388	2	1,605	38,509	21.3
COMPRESSOR RUN-TIME	0	20	1,140	27,357	15.2
SAFETY LOAD	10	24	684	16,414	9.1
TOTAL BOX LOADS			7,523	180,559	100.0

BOX LOAD DESCRIPTIONS	AREA QUAN	REQUIRED BTUH CAP	24 HR BTU LOAD	% TOT LOAD
TRANSMISSION	1,366	2,019	48,463	26.8
INTERNAL		2,076	49,815	27.6
PRODUCT AND CONTAINER	0	0	0	0.0
INFILTRATION	388	1,605	38,509	21.3
COMPRESSOR RUN-TIME	20	1,140	27,357	15.2
SAFETY LOAD	10	684	16,414	9.1
TOTAL BOX LOADS		7,523	180,559	100.0

TOTAL REFRIGERATED AREA:	300	SQUARE FEET
TOTAL REFRIGERATED VOLUME:	3,150	CUBIC FEET
TOTAL ENVELOPE AREA:	1,366	SQUARE FEET
TOTAL WEIGHT OF PRODUCT:	13,000	POUNDS
TOTAL WEIGHT OF CONTAINERS:	0	POUNDS
WEIGHT OF PRODUCT PER SQ FT:	43.3	POUNDS PER SQ.FT
REFRIGERATED AREA PER TON:	478.5	SQ FOOT PER TON
REQUIRED 24 HR LOAD:	180,559.0	BTU
REQUIRED TONNAGE (20 HR RUNTIME):	0.6	TONS
REQUIRED CAPACITY (20 HR RUNTIME):	7,523.3	BTUH

Summary of Refrigeration Systems

Compressors/Condensers							Evaporators							
Quantity	MFG.	Model	HP	Notes	Refrig.	Capacity BTU/HR	Quantity	MFG.	Model	Defrost	HP	Area Served	Capacity BTU/HR	Estimated Heat Gain BTU/HR
Central Low Temperature System														
1	Carrier	5H60-104	50	Compressor #1	R502	165,000	2	Krack	BL42512	Water	7 1/2	Meat Freezer	2 @ 110,000	280,000
1	Carrier	5H60-104	50	Compressor #2	R502	165,000	1	Krack	8VC2100ED	Electric	2 @ 1/4	Ice Storage	21,000	38,885
1	Dunham Bush	DDEC-230		Condenser #1 (ECL)	R502	350,000								
Central Medium Temperature System														
1	Carrier	5H40-548	40	Compressor #3	R-22	400,000	2	Krack	BUC2700ED	Electric		Egg Room	27,000	31,850
1	Carrier	5H40-548	40	Compressor #4	R-22	400,000	3	Krack	BUC2700ED	Electric		Mini-Mart Staging/Hall	27,000	12,700
1	Carrier	5H40-548	40	Compressor #5	R-22	400,000	2	Krack	CPL 1326-6(PC-2)		3	Fresh Produce/Veg. Cooler	13,000	63,600
							2	Krack	CP8810R		3	Issue Room	16,500	67,400
1	Evapco	689-30335E		Condenser #2 (ECH)	R-22	530,000	1	Krack	SS-244-170EDL-DXF(C-4)	Electric	2	Mini-Mart Produce	17,000	
							1	Krack	CP1326-6(C-4)		3	Mini-Mart Produce	13,000	35,800
							1	Krack	BUC950			Mini-Mart Egg Room	9,500	37,000
Packaged Units 1 & 2														
2	Copeland	MRA2-0500 TFD			R-22	19,300	1	Bohn	LB727202A	Electric		North Freezer (WF-1)		57,200
Packaged Unit No. 3														
1	Copeland	3RA1-0310-TAC			R-502	18,800	1	Bohn	ADT2541A	Electric		Oleo Room		24,700
Packaged Unit No. 4 (Not in Operation)														
1	Maneurop	CMT160-3M1			R-22	40,250	1	Russell	AE66-280	Electric		New South Freezer	28,000	–
Packaged Unit No. 5														
1	Maneurop	T60-GM1 (?)			R-502		1	Russell	AE66-245	Electric		Mini-Mart Freestanding	24,500	–
Packaged Unit No. 6														
1	Hill Refrig.	NR2LAL5-T3			R-502	13,000	1	Hill	N712FK	Electric		Mini-Mart Display Case	336/Ft.	–
Packaged Unit No. 7														
1	Bohn	B8L5JP			R-502	37,300	2	Bohn	2400EL-2	Electric		Veg. Freezer (WF-2)	24,000	76,200

Water Heater Replacement Evaluation

Current Equipment: Three gas heaters of indeterminate age. Not all appear to be in use. Estimated energy use is $500/year. This was estimated by considering two of the three heaters in use part time, with significant losses in efficiency due to the low usage. Approximately equivalent to one more modern heater in use in an average home.

Replacement: 4 instantaneous heaters, capacity 2 gallon/minute.

Base price: $208. Add 25% for wiring and installation = $260/ea.

Location: Mini-Mart latrine, VET office, VET office latrine, locker room latrine.

Estimated Energy Savings:

Assume runtime 3 hrs/day total all four heaters @ 9.5 KW

3hr x 9.5KW + 28.5 KWH/day

28.5 KWH/day x 260 days/year x 3413/1000000 MBTU/KWH = 25.3 MBTU/yr

25.3 MBTU x $13.93/MBTU = $352/year energy usage

$500 - $352 = $148/year

158 - 25.3 MBTU/year = 133 MBTU/yr

Fort Campbell Cold Storage Facility (Building 5202)
Lighting Retrofit Analysis

1/93
Corry

Room	Ceiling (ft)	Area (sq.ft.)	Existing Incandescent			Fluorescent Fixtures Requirements									
			Quantity	Watts	Lumens @ 17	Coverage Factor	Basic Quantity	Footcandles Required	Adj. for Footcandles	Adj. 7 ft to work	No. of Fixtures	Lamps Quantity	Input Watts 203	Lumens @ 16,600	Cost @ $257
Mini-Mart Checkout	10.5	1,125	14	2,800	47,600	60	18.75	70	13.13	12.08	12	24	2,436	199,200	$3,083
Mini-Mart (assumes no free-standing unit)	10.5	2,750	22	2,200	37,400	60	45.83	30	13.75	12.65	13	26	2,639	215,800	$3,340
Vegetable Cooler (PC-2)	10.5	1,050	12	1,800	30,600	60	17.50	20	3.50	3.22	3	6	609	49,800	$771
Vegetable Freezer (VF-2)	10.5	1,275	12	1,800	30,600	60	21.25	20	4.25	3.91	4	8	812	66,400	$1,028
Egg Room	10.5	1,350	20	2,000	34,000	60	22.50	20	4.50	4.14	4	8	812	66,400	$1,028
Mini-Mart Hallway	10.5	860	11	1,650	28,050	50	17.20	20	3.44	3.16	3	6	609	49,800	$771
Issue Room	10.5	1,825	20	3,000	51,000	60	30.42	30	9.13	8.40	8	16	1,624	132,800	$2,056
Main Meat Freezer	10.2	3,150	36	3,600	61,200	60	52.50	20	10.50	9.66	10	20	2,030	166,000	$2,570
Passage	11	1,335	20	2,000	34,000	60	22.25	20	4.45	4.09	4	8	812	66,400	$1,028
Staging Area	10.75	1,950	30	3,000	51,000	60	32.50	30	9.75	8.97	9	18	1,827	149,400	$2,313
North Freezer (VF-1)	10.2	1,250	8	800	13,600	60	20.83	20	4.17	3.83	4	8	812	66,400	$1,028
Oleo Room	10.25	700	6	600	10,200	50	14.00	20	2.80	2.58	3	6	609	49,800	$771
Crushed Ice	10.5	270	3	300	5,100	50	5.40	20	1.08	0.99	1	2	203	16,600	$257
Mechanical Room	15.25	634	8	800	13,600	50	12.68	30	3.80	3.50	3	6	609	49,800	$771
Boiler Room	16.3	232	4	100	1,700	50	4.64	30	1.39	1.28	1	2	203	16,600	$257
Locker Room	8.8	326	14	100	1,700	50	6.52	50	3.26	3.00	3	6	609	49,800	$771
VET's Office	8.8	286	14 fluorescent	1120	67,200	50	5.72	100	5.72	5.26	5	10	1,015	83,000	$1,285
Cold Storage Office	8.8	339	36 fluorescent	2880	172,800	50	6.78	70	4.75	4.37	4	8	812	66,400	$1,028
Mini-Mart Latrine	9	190	5	100	1,700	50	3.80	50	1.90	1.75	2	4	406	33,200	$514
Mini-Mart Locker Room	9	190	6	600	10,200	50	3.80	50	1.90	1.75	2	4	406	33,200	$514
Mini-Mart Egg Room	10.5	244	4	400	6,800	50	4.88	20	0.98	0.90	1	2	203	16,600	$257
Mini-Market Produce (C-4)	10.25	745	8	800	13,600	50	14.90	20	2.98	2.74	3	6	609	49,800	$771
		22076	Total Inc. 263	Total Inc. 32,450	Average 32,893						Total 102	Total 204	Total 20,706	Average 76,964	Total $26,210

Assumptions/Sources:

Illuminating Engineering Society recommended minimum light levels
- Stockroom: 30 Footcandles
- Medium Warehousing: 20 Footcandles
- Office, reading/transcribing: 70
- Grooming Areas: 50

Assumed Lamp Efficacies:
- Existing Incandescent lamps @ 17 LU/W
- Existing Fluorescent Lamps @ 60 LU/W
- New Fluorescent 16,600 LU/190 W = 87 LU/W
- LU = Lumens W = Watts

Lighting operates 8760 hrs/year (interviews, observations)
Energy Co (Loflin, Energy Awareness Program, FY 1991 Data)
Additional Savings from wattage reduction in refrigerated areas = 0.5 watt/watt
Average life span incandescent lamps 750 hrs, cost $0.26/100 W (Loflin)
Average life span fluorescent lamps 12,000 hours

ITEM		Watts	Hours	Usage			Savings		
				KWH/yr	MBTU/yr	($/year)	MBTU/yr	($/year)	(Percent)
Current Energy Usage CSF Lighting		32,450	8,760	284,262	970	$13,447	-	-	-
Current Usage Refrigerated Areas		14,300	8,760	125,268	428	$5,926			
Fluorescent Energy Usage		20,706	8,760	181,385	619	$8,580	351	$4,867	36.2%
Fluorescent Usage Refrigerated Areas		9,338	8,760	81,801	279	$3,870			
Refrigeration Load Savings (.5W/W)							74	$1,028	7.6%
Fewer lamp changes annually								($373)	-2.8%
Combined							425	$5,522	41.1%

Lamp Changes Savings	Period (yrs)	Period (hrs)	Life (hrs)	Lamp Cos ($/ea)	No. Lamps	Replaceme (over life)	Cost ($)	Cost/yr ($/yr)
Incandescent	15	131,400	750	$0.26	263	46,078	$11,980	$799
Fluorescent	15	131,400	12,000	$7.87	204	2,234	$17,580	$1,172
Savings								($373)

OGDEN

Job Name: FORT CAMPBELL
Job Number:
Title:
Computed by: LB Checked by:
Date: 11/17/92 Sheet: 2 Of:

TASK 2 - INSTALL CEILING INSULATION IN AREA OF ENTIRE BLDG TO UPGRADE R-9± TO R-30 ± WITH BATTS - NO VAPOR BARRIER

ROOF AREA = 227.33 X 110.0 = 25,006 SF

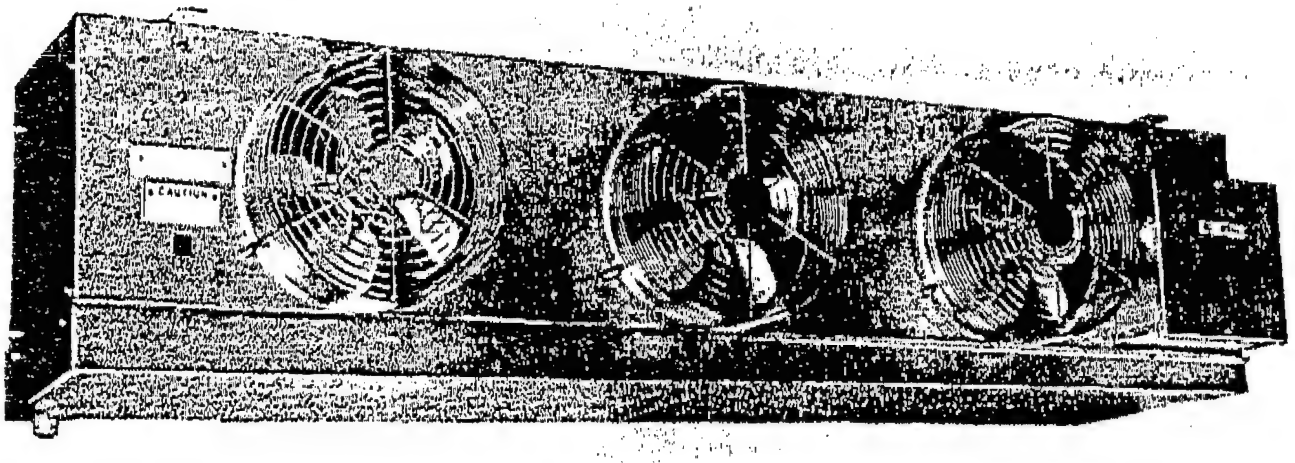
FROM MEANS 1993

022-118-0880/169 FIBREGLASS R-19 23" WIDE .57/SF

FOR $0.57/SF - TOTAL = $ 14,253.±

FEATURES

KRACK COMMERCIAL EVAPORATO



Low-Silhouette is ideal for 8 to 12 foot high coolers and freezers.

High Efficiency four row deep coils utilize 1/2" OD staggered copper tubes mechanically expanded into corrugated aluminum fins spaced by tube collars.

Wide Fin Spacing reduces air blockage caused by frost. Four and five fin/ inch models are recommended for low temp. Six and seven fin/inch models are ideal for med temp.

Automatic Defrost with air, electricity or hot gas is available for all models.

Housing and Drain Pan are constructed of textured corrosion resistant aluminum. Top and front are one piece with removable end panels. Double pitched removable drain pans allow units to be hung level.

Individually Compartmented fan sections prevent reverse rotation in event of motor failure. Fans are 10 inch diameter and are located a proper distance from the coil to create efficient draw-thru air flow.

TEAO Fan Motors are totally enclosed with internal overheat protection and lifetime lubricated ball bearings. Motors have 16 watt output, 1550 RPM, are suitable for 115 or 208-230/1/50-60, and have plug-in receptacles for quick connection.

Plastic Fan Guards create 40-50 ft air throw. Optional **Wire Fan Guards** are recommended for 10-20 ft air throw.

Low Sound Levels range from 57 decibels generated by one fan units to 63 decibels produced by 6 fan units; as measured on the "A" scale, 6 feet in front of unit.

DESIGN STANDARDS

- UL Listed
- ASHRAE Testing Procedure
- ARI Rating Standard
- National Electric Code
- NSF With Wire Fan Guards

ACCESSORIES

- TEV Thermostatic Expansion Valve
- LSV Liquid Line Solenoid Valve
- SLHX Suction Liquid Heat Exchanger
- Defrost Time Clocks

SPECIFICATIONS

CAPACITY DATA

7 FPI MED TEMP	CAPACITY BTUH 10°TD	15°TD	AIR CFM	NO FANS	WEIGHT—LBS A	ED	KGE-HGE
HS-17-50	5000	7500	670	1	65	75	70
HS-27-100	10000	15000	1340	2	95	105	100
HS-37-150	15000	22500	2010	3	125	135	130
HS-47-200	20000	30000	2680	4	160	175	165
HS-57-250	25000	37500	3350	5	195	210	200
HS-67-300	30000	45000	4020	6	210	230	215

6 FPI MED TEMP	CAPACITY BTUH 10°TD	15°TD	AIR CFM	NO FANS	WEIGHT—LBS A	ED	KGE-HGE
HS-16-45	4500	6750	680	1	60	70	65
HS-26-90	9000	13500	1360	2	90	100	95
HS-36-135	13500	20250	2040	3	120	130	125
HS-46-180	18000	27000	2720	4	155	170	160
HS-56-225	22500	33750	3400	5	190	205	195
HS-66-270	27000	40500	4080	6	205	225	210

5 FPI LOW TEMP	CAPACITY BTUH 10°TD	12°TD	AIR CFM	NO FANS	WEIGHT—LBS A	ED	KGE-HGE
HS-15-40	4000	4800	690	1	55	65	60
HS-25-80	8000	9600	1380	2	85	95	90
HS-35-120	12000	14400	2070	3	115	125	120
HS-45-160	16000	19200	2760	4	150	165	155
HS-55-200	20000	24000	3450	5	185	200	190
HS-65-240	24000	28800	4140	6	200	220	205

4 FPI LOW TEMP	CAPACITY BTUH 10°TD	12°TD	AIR CFM	NO FANS	WEIGHT—LBS A	ED	KGE-HGE
HS-14-35	3500	4200	700	1	50	60	55
HS-24-70	7000	8200	1400	2	80	90	85
HS-34-105	10500	12600	2100	3	110	120	115
HS-44-140	14000	16800	2800	4	145	160	150
HS-54-175	17500	21000	3500	5	180	195	185
HS-64-210	21000	25200	4200	6	195	215	200

ELECTRICAL DATA

ANY MODEL	FAN MTR AMPS 115/1	230/1	ELECTRIC DEFROST HEATER AMPS 208/1	230/1	208/3	230/3	WATTS 230V	KGE-HGE PAN AMPS 115/1	230/1	WATTS 115V
HS-1	1.1	0.55	4.7	5.2	2.7	3.0	1200	2.6	1.3	300
HS-2	2.2	1.10	9.4	10.4	5.4	6.0	2400	5.2	2.6	600
HS-3	3.3	1.65	14.1	15.6	8.2	9.1	3600	7.0	3.5	800
HS-4	4.4	2.20	18.8	20.8	10.9	12.1	4800	8.7	4.4	1000
HS-5	5.5	2.75	23.6	26.1	13.7	15.1	6000	9.6	4.8	1100
HS-6	6.6	3.30	28.3	31.3	16.4	18.1	7200	12.2	6.1	1400

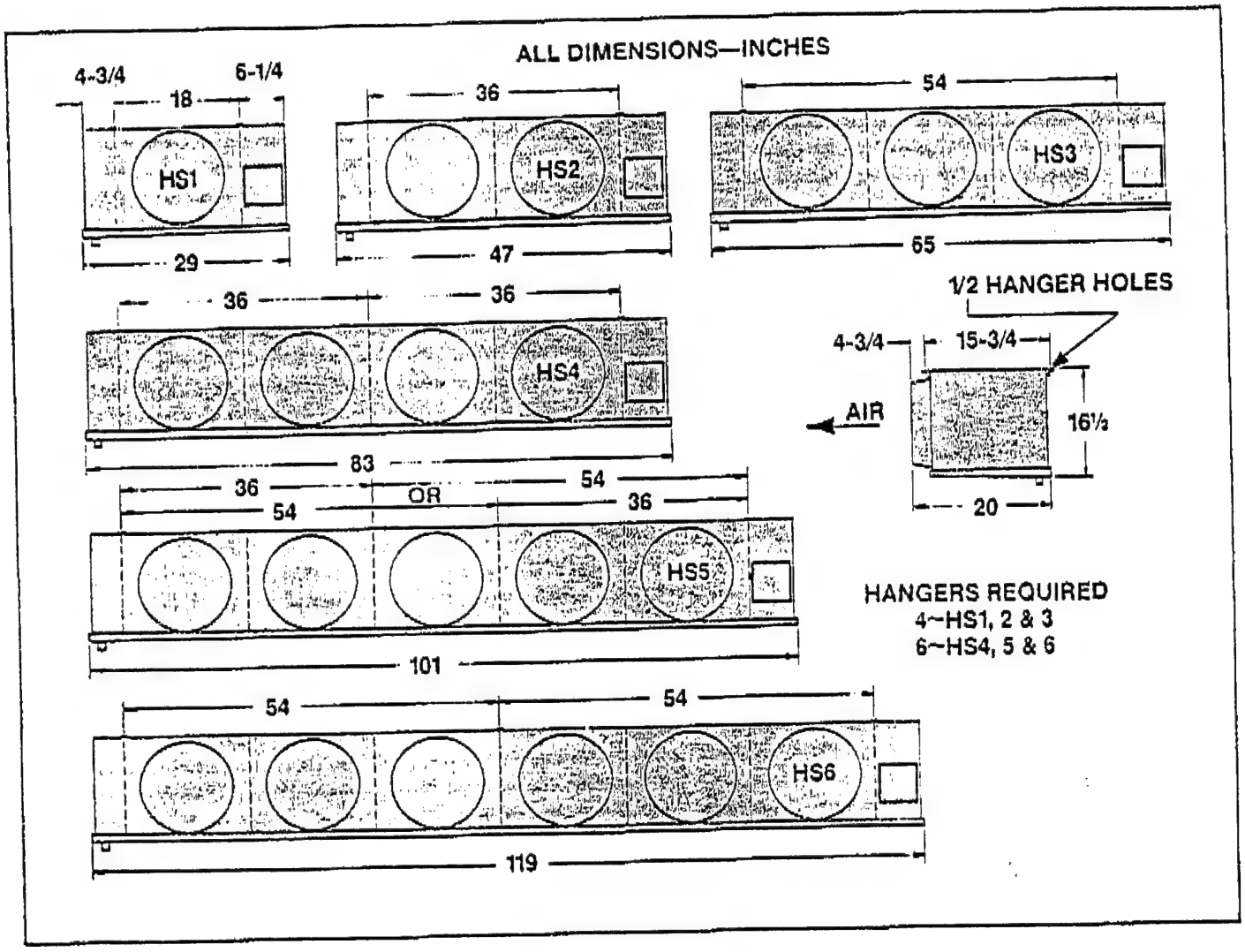
COIL DATA

ANY MODEL	FACE AREA SQ FT	COIL VOL CU FT	REFRIG CHARGE LBS	CONNECTIONS LIQ FLARE	SUCT ODS	DRAIN FPT	KG-HG TEE ODS
HS-1	1.7	0.08	1.8	1/2	5/8	3/4	1/2
HS-2	3.4	0.16	3.5	1/2	7/8	3/4	1/2
HS-3	5.1	0.23	5.2	1/2	7/8	3/4	1/2
HS-4	6.7	0.31	6.8	1/2	1-1/8	3/4	1/2
HS-5	8.4	0.38	8.5	1/2	1-1/8	3/4	1/2
HS-6	10.1	0.46	10.2	1/2	1-1/8	3/4	1/2

Capacity Ratings are based on sensible heat removal with a TEV fed, medium frosted coil when:

- SST (sat suct temp) is above -20°F
  Derate 10% for -30°F
- TEV superheat does not exceed 10°F above SST
- Med temp selection TD is from 10 to 15°F
  Low temp selection TD is from 8 to 12°F
  (TD is the temp difference between room and SST)
- Fan motor heat is not included in rating—add to room load—250 BTUH per fan
- Derate 12% for 50 HERTZ (0.88 mult) or increase TD to compensate for lower fan RPM—10 to 11.4° TD or 12 to 13.6° TD

DIMENSIONS



MODEL KEY

HS-46-180-A
HS-36-120-ED
HS-54-175-KGE

NO FANS
FINS/INCH
STUB 10"TO (00)—
DEFROST

A —AIR
ED —ELECTRIC
KGE —2 PIPE HOT GAS
HGE —3 PIPE HOT GAS

Please Specify:

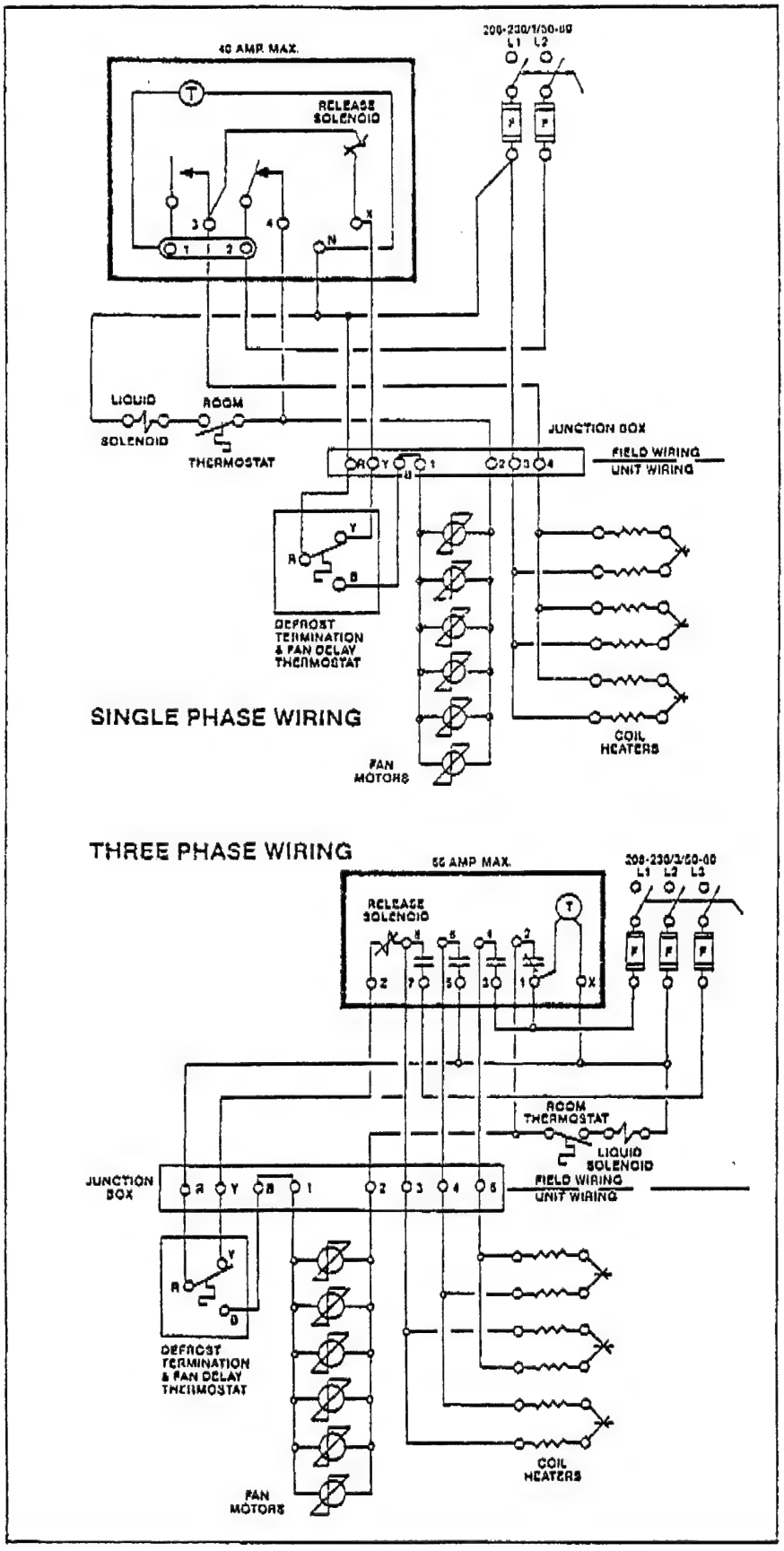
- Complete Model Number
- Refrigerant—R12, R22, R502
- Room Temp
- Sat Suction Temp
- Electrical Characteristics
  Motors—Heaters—Control Voltage
- Accessories
- Plastic Or Wire Fan Guards

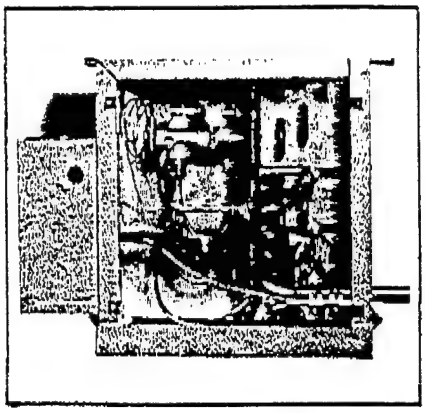
We reserve the right to change or revise specifications and product design in connection with any feature of our products. Such changes do not entitle the buyer to corresponding changes, improvements, additions or replacements for equipment previously sold or shipped.

Application of Hite-Saver unit coolers is recommended in small walk-in coolers and freezers above -20° F with ceiling heights up to 12 feet. Air throw is 40-50 ft. Locate units 9 inches from walls for best results. Support piping adequately with suction line "P" traps at unit. Locate LSV close to TEV. Condensate drain lines must be adequately heat traced in rooms below freezing. Use externally equalized TEV except for HS-1.

Units circuited for water, glycol brines, or recirculated halocarbon systems are available.

ELECTRIC DEFROST

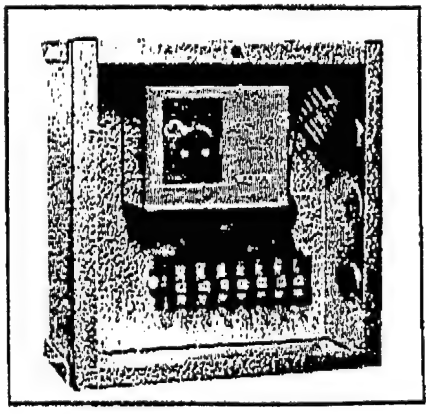




Efficient stainless steel tubular heaters rated for 115 volts, are inserted in fin grooves, two on the face and four on the coil bottom. Heaters are replaceable from the face or by removing the drain pan. Standard electric defrost configuration is with 208-230/1/50-60 fan motors and heaters wired for 230 volt, single or three phase. If 208 volt or lower power abnormally extends defrost cycles, three phase heaters are easily reconnected in star to obtain 230 volt wattage.

Defrost cycles are time clock initiated and temperature terminated by a factory mounted adjustable thermostat which creates a fan re-starting delay preventing warm air and condensate from being discharged into the space. The timer has a fail-safe feature. Its time setting is longer than necessary resulting in a second termination if the termostat should fail.

When defrosting two Hite-Savers at one time with one time clock; temp termination thermostats must be wired in series.



OGDEN

Job Name: Four Campbell
Job Number:
Title: Task #7 & # 8
Computed by: WJR Checked by:
Date: 11/19/92 Sheet: 2 of 2

TASK #7 - Doors & Curtains

PLASTIC, FLEXIBLE AIR CURTAINS

083-551-0200 Plastic Flex. 385ft² @ $13.40/ft² = $5159
(11 doors @ 5'x7' = 385ft²)

083-551-0300 Mounting Costs .55 lin ft @ $8.55/in/ft = 471
(11 doors @ 5' = 55 lft)

$5630

For Replacement of Existing Wood Doors with Cold Storage Doors

083-251-5010 Bi-parting, 4" thick, galv.
For Coolers = 10 @ $6875/ea = 68,750
For Freezers = 3 @ $7525/ea. = 22,575
$91,325

TASK # 8 DOOR SEALANT

079-204-4500 Neoprene Gaskets, Adhesive
1/4" x 3/4" ⇒ $1.88/ft.

Ice Room Only = ≈ 26 lft @ 1.88 lft = $48.88

ALL OTHER DOORS = 304 lft @ 1.88 lft = 571.52

16 DOORS @ 19 lft/door = 304

$924.40 $620.40

Fort Campbell Cold Storage Facility, Building 5202
Compressor Motor Replacement

1/93
Corry

System	Design Temp. (F)	Rating (HP)	Motor Efficiency (Nom.%)	Estimated Run Time (hrs/day)	Estimated Shaft Load (%)	Estimated Run Time (hrs/yr)	(HPhr/yr)	Estimated Energy Use (KWH/yr)	(MBTU/yr)	Estimated Cost ($/yr)
Existing										
Central Low Temperature	0 to -10									
Compressor #1 Motor		40	90%	20	80%	3,650	129,490	96,561	329.6	$4,587
Compressor #2 Motor		40	90%	20	80%	3,650	129,490	96,561	329.6	$4,587
					Total	7,300	258,980	193,121	659.1	$9,173
Existing										
Central Medium Temperature	35-42									
Compressor #3 Motor		50	90%	20	80%	2,433	107,908	80,467	274.6	$3,822
Compressor #4 Motor		50	90%	20	80%	2,433	107,908	80,467	274.6	$3,822
Compressor #5 Motor		50	90%	20	80%	2,433	107,908	80,467	274.6	$3,822
					Total	7,300	323,725	241,402	823.9	$11,467
Replacement										
Central Low Temperature	0 to -10									
Compressor #1 Motor		40	94%	20	80%	3,650	124,123	92,559	315.9	$4,397
Compressor #2 Motor		40	94%	20	80%	3,650	124,123	92,559	315.9	$4,397
						7,300	248,247	185,117	631.8	$8,793
Replacement										
Central Medium Temperature	35-42									
Compressor #3 Motor		50	94%	20	80%	2,433	103,436	77,132	263.3	$3,664
Compressor #4 Motor		50	94%	20	80%	2,433	103,436	77,132	263.3	$3,664
Compressor #5 Motor		50	94%	20	80%	2,433	103,436	77,132	263.3	$3,664
						7,300	310,308	231,397	789.8	$10,991

Assumptions

Energy Cost	$0.0475	/KWH
	$13.929	/MBTU

Motor	Initial Cost ($)		Savings (MBTU/yr)		Savings/Year ($)	
	One Motor	Two Motors	One Motor	Two Motors	One Motor	Two Motors
40 HP	$1,800	$3,600	27.3	27.3	$380	$380
50 HP	$2,100	$4,200	34.1	34.1	$475	$475

Fort Campbell Cold Storage Facility
Dock Enclosure and HVAC Modifications

Rooms	Size	Recorded	Existing Use	Proposed Use	Change Required	Estimated	Estimated	Additional Energy Usage		Estimated Energy Savings	
~	(sq.ft.)	Temp. (F)				Cost ($)	Salvage ($)	(MBTU/yr)	($/yr)	(MBTU/yr)	($/yr)
Mini-Mart main room,	2,750	50	Open to customers,	Same, but remove Free-Standing	Replace air handling unit with new	$8,750					
Mini-Mart Produce, and	755	45	contains freezers	Freezer and use Produce and	evaporator;						
Mini-Mart Egg Room	244	44		Egg Rooms as Freezers	Remove Free-Standing Freezer;		$35,105			250	$3,483
					Maintain at 40-50 F						
					Reconnect Produce and Egg Rooms	$4,000					
					to Central Low Temperature System						
New South Freezer	-		Not In Use	Remove	Dismantle; sell		20000				
Oleo Room	-		Butter	Standby	Place Oleo Room on Standby					118	$1,644
North Freezer	-		Frozen Food	Standby	Place North Freezer on Standby					264	$3,678
Subtotal	3,749					$12,750	$55,105			632	$8,804
Mini-Mart Checkout	1,125	Ambient	Open to customers,	same plus office for	Remove air handling, meat processing		$0				
			checkout and office	cold storage personnel	equipment; connect to HVAC #1						
Mini-Mart Office	190	Ambient	Filing	Office/files	Connect to HVAC #1						
Mini-Market Locker	190	75	Locker Room	Same	Connect to HVAC #1						
Mini-Market Latrine	190	75	Latrine	Same	Connect to HVAC #1						
Mini-Mart Hallway	860	52			Remove meat racks; connect to HVAC #1		$3,000				
Subtotal	2,555					$12,775	$3,000	167	$527	0	$0
Issue Room	1,825	Ambient	Staging for breads, milk	Same	Repair or replace passage doors;	$5,000					
North Storage Staging	1,950	Ambient	Irradiated Milk, forklifts,	Same	Enclose Docks;	$33,233					
			carts, pallets, dry goods		Connect Rooms to HVAC#2	$56,305					
Passage	1,335	Ambient	Passageway	Same	Move Forklifts to Enclosed Area	$5,000					
CSF Office	339	71	Office	Break Room							
VET's Office	286	70	Office/Lab	Same							
Locker Room	326	70	Locker Room	Same							
East Enclosed Dock	1,400	Ambient	Open (Covered) Dock	Enclosed Passage and Storage							
West Enclosed Dock	3,800	Ambient	Open (Covered) Dock	Enclosed Delivery Dock							
Subtotal	11,261					$99,538	$0	737	$2,329	0	$0
Boiler	-	-	Provide Space Heating	Replace with HVAC Systems	Remove Boiler;	-	$500			856	$2,705
Heat Reclaim	-	-	-	Provide Space Heating		$2,000				158	$499
Subtotal						$2,000	$500	0	$0	1,014	$3,204
TOTAL						$127,063	$58,605	904	$2,856	1,646	$12,008

OGDEN

Job Name: Fort Campbell
Job Number:
Title: Task #2
Computed by: WJR Checked by:
Date: 11/15 Sheet: 1 Of 1

TASK #2 ENCLOSE DOCKS INCLUDING OVERHANG FOR MINI-MART DOCK

Overhang Roof for Mini-Mart

Aluminum, corrugated on steel frame = $1.95/sq. ft.

14' x 63' = 882'

14 x $\frac{15' 1\frac{1}{2}''}{2}$ = 259

1190.5 sq ft x $1.95 ft² = $2,333 (A)

Enclosure WALLS

Drivit System w/ 2" Insulation = $5.75/sq. ft

West Dock	162 ft x 10.5' h	= 1701 ft²	
EAST Dock	72' x 10.5' h	= 756 ft²	
EAST Roll-Up	5' x 10.5' h	= 52.5 ft²	
		2509.5 @ $5.75 =	$14,430 (B)

Doors

#089-602-0030 Automatic, 5' x 7' Door, West Dock — $6425/ea (2) = $12850

#083-551-0200 Plastic, Flexible Air Curtain 35 ft² @ $13.40 ea = $469

#083-551-0300 Mounting costs 5' @ $8.55 lin/ft = $42.75

#081-103-1760 Insulated Door 3' x 7' = $274

$13636 (C)

EAST Dock

Roll-UP Door w/ 3' x 7' Pass Door

#83-732-0100	ONE Door 10' x 10' = $1275		= 1275
#83-720-1600	3' x 7' Door =	755	= 755
#72-116-0600	Insulation, Rigid, 3" R13 @ 100 ft² @ 2.46 =		= 246
			$2,276 (D)

East Dock - Utility Enclose DOOR

#081-103-1760 2 - 3' x 7', INSULATED — $548 (E)

SUMMATION OF COSTS = A+B+C+D+E = $33,223

OGDEN

Job Name: Ft Campbell

Job Number:

Title: Task #9, Close Egg Room Door

Computed by: WJR Checked by:

Date: 11/19/92 Sheet: 1 Of:

Task #9 - Close Egg Room Door

① Masonry Block Construction - Painted

② REMOVE EXISTING DOOR - No Salvage Value
May be used as a replacement
for other existing doors, if necessary

③ INSULATION

Masonry Block - 5'x7' Area = 35 ft²

042-232-4200 8"x16"x8" loaded both sides $5.05/ft² x 35 = $176.75

072-116-1660 2" Panel each side (ea. 4)
70 ft² @ 1.43 ft² = 100.01

$276.85

ADD 20% for Small Job = x 1.20

$332.22

$335

OGDEN

Job Name: Ft. Campbell
Job Number:
Title: Task #10 - Scrap Stand Alone Freezer
Computed by: WSR Checked by:
Date: 11/19/02 Sheet: 1 Of: 1

TASK #10
(A) Scrap stand alone freezer
(B) Scrap TWO Coffin Freezers

(A) BROWN STAND ALONE freezer - MINI-MART

New Costs for 17'-4 x 45'-1½"

Costs for stand-alone (No Freezing Units)

7'-6" x 12' x 20' = $105/sqft floor

Assume 15% more cost for expanded ceiling ht = (105)(1.15) = $121 ft²

Therefore, 17'-4" x 45' 1½" ≈ 780 ft²

780 ft² ($121/ft²) = $94,380

Cost of Freezing units

2 @ $6000 = $12,000

TOTAL COST = $106,380

Assume salvage @ 33% = $35,105

(B) COFFIN FREEZERS

New Costs of UNITS ≈ $32,000

Assume Salvage @ 20% = $6,400

OGDEN

Job Name: Ft. Campbell
Job Number:
Title: Task # 11 - Meat Hanger Removal
Computed by: [illegible] Checked by:
Date: 11/19/92 Sheet: 1 Of: 1

Task # 11 Meat Hanger Removal

Assume:
New Overhead Monorail, manual
125 lb per l.f.
145-500-3700 $21.50 l.f.

890 l.f.

$19,135

Assume Worst Case: No salvage value as a overhead monorail system.

Only salvage is scrap metal

Two Methods

① $19,135 x 10% (salvage value/dollar) = $1913.50

OR

② 890 ln ft (125 lb/l.f.) = 111,250 lbs

111,250 lbs ($0.05/lb) = $5,562.50

Johnson Controls, Inc.
Systems and Services Division
6101 Industrial Heights Drive
Knoxville, TN 37909
Tel. 615/588 1197

JOHNSON CONTROLS

January 7, 1993

Kelso Regen Associates
6709 B Kingston Pike
Knoxville, Tn. 37919

Attn: Mr. Dick Kelso

Subject: Cold Storage Project

Dear Dick,

Per our discussion of this past November and subsequent conversation this morning, I have listed below a summarization of the cold storage project as I understand it.

The project will consist of 116 total computer points, 34 which are analog input points and 82 which are binary output points.

Our budget figure includes a personal computer and necessary Metasys hardware. Wiring is not included.

The budget figure is $47,400.00.

Enclosed are product data sheets describing the proposed components.

Please call me with questions.

Sincerely,

Steve Cole

Steve Cole
Account Executive

SMC:je
Enclosure

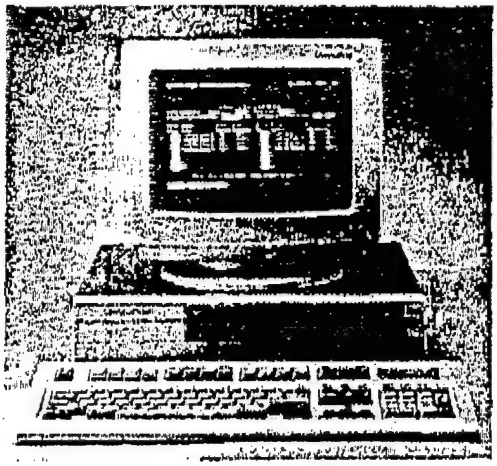
-METASYS-

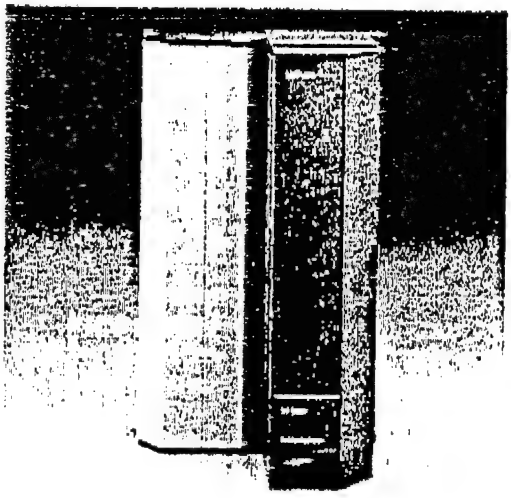
Companion

The Metasys Companion™ system is an economical way of monitoring and controlling HVAC equipment. Companion uses many components common to the Metasys family, including: Air Handling Unit, Lab and Central Plant, Unitary, and Variable Air Volume terminal controllers, all connected to a common local communication network.

Companion adds many powerful energy management and monitoring features to the HVAC Application Specific Controllers (ASCs), which already provide complete digital control for most common HVAC configurations.

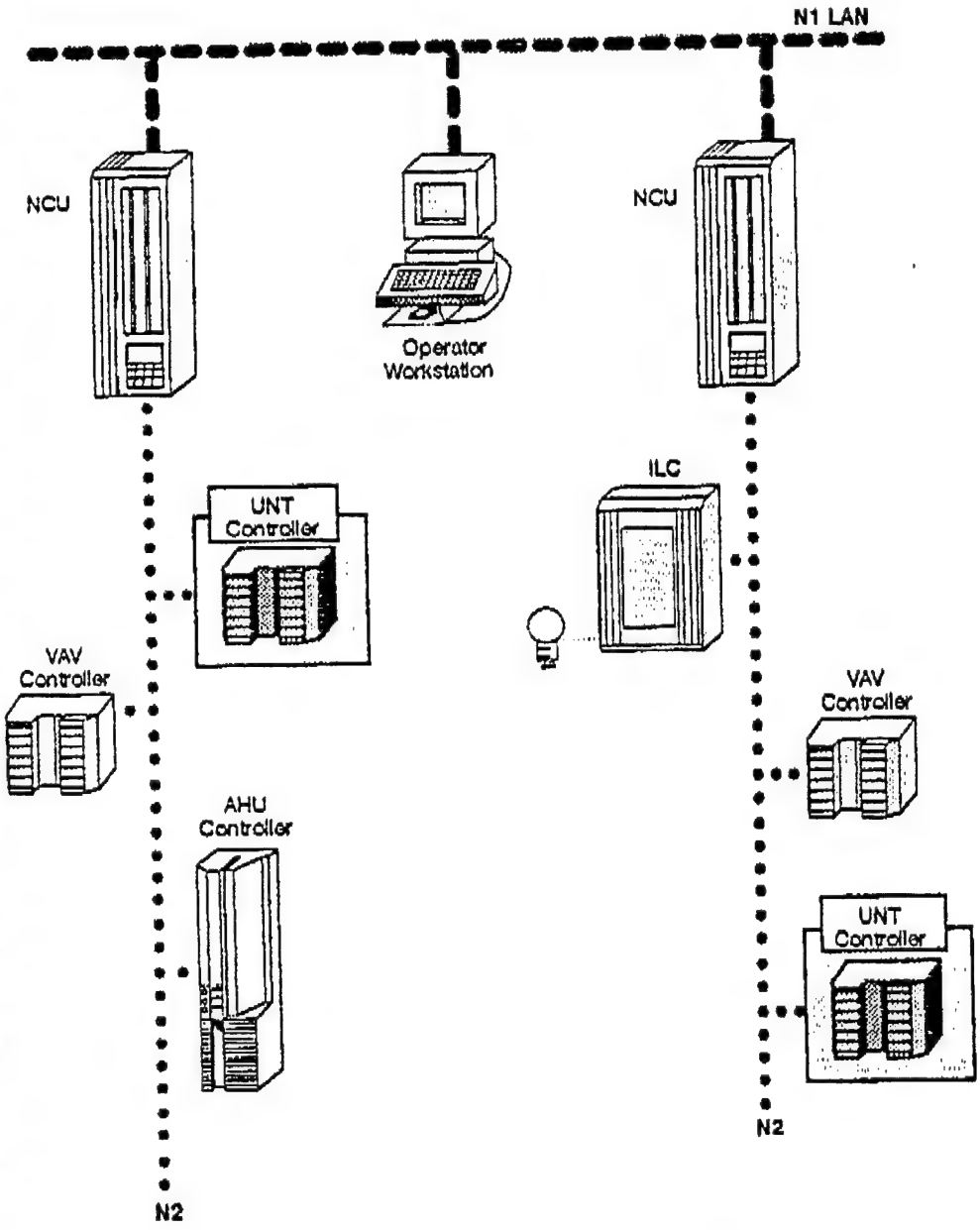
Companion offers the capacity and performance to meet the needs of less complex buildings. For the building owner with a limited budget, Companion offers a cost effective means of improving environmental control and information access of HVAC ASCs.





Features	Benefits
■ Multiple configurations ■ Breadth of HVAC ASC line	Application flexibility.
■ Standard built-in energy management programs ■ Network-wide interlocking	Improved environmental control and reduced operating cost.
■ Standard summaries ■ Trending	Quick and efficient facility analysis.
■ Menu-driven interface ■ Color graphics mouse driven interface ■ Fill-in-the-blank templates ■ User configured data base	Easy to use, and allows the user to become self-sufficient.

Order No. 635-140



UNT Controller in Metasys Network
Fig. 1

Ft. Campbell
Cold Storage Facility
Energy Study

APPENDIX 4

ECONOMIC ANALYSIS OF ALTERNATIVES

January 1993

Ft. Campbell Cold Storage Facility
Recommended Energy Conservation Opportunities

Energy Conservation Opportunity	Estimated Construction Cost ($)	Estimated Total Investment ($)	Estimated Energy Savings (MBTU/yr)	Estimated Energy Savings ($/yr)	Other Savings (+) or Costs (-) One-Time ($)	Other Savings (+) or Costs (-) Annual ($/yr)	Simple Payback Period (yrs)	Savings to Investment Ratio
Replace old water heaters with instantaneous heaters in restrooms and VET office	$1,040	$1,165	133	$148	_	_	7.9	3.3
Replace existing lighting which is mostly incandescent with fluorescent fixtures and lamps.	$26,210	$29,225	425	$5,518	-	($373)	5.3	2.1
Add insulation between compartment ceilings and roof	$15,000	$16,725	145	$2,016	_	_	8.3	1.7
Replace main meat freezer evaporators with updated electric defrost models	$48,000	$53,760	122	$1,700	_	$4,500	8.6	1.5
Install plastic curtains on doors without them and reseal all cooler doors	$6,250	$6,969	54	$752	_	_	9.3	1.5
Install High-Efficiency Compressor Motors on Central Medium and Low Temperature Systems	$7,800	$8,697	64	$897	_	_	9.7	1.4
Replace boiler, install HVAC systems, enclose docks, move forklifts, shut down oleo room, north freezer, free-standing freezer, repipe Mini-Mart Egg and Mini-Mart Produce to make freezers, remove unused equipment from CSF	$127,063	$142,311	742	$9,151	$58,605	_	11.7	1.3
Computerized Control System for HVAC and refrigeration systems	$52,140	$58,397	389	$5,419	-	$3,288	6.7	1.2
TOTAL	$283,503	$317,107	2,074	$26,274	$58,605	$7,415	8.6	1.6
TOTAL ASSUMING 15% REDUCTION IN SAVINGS DUE TO SYNERGISTIC EFFECTS	$283,503	$317,107	1,763	$22,329	$58,605	$7,415	9.7	1.5

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: WATER HEATER REPLACEMENT
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$ 1040.
B. SIOH	$ 58.
C. DESIGN COST	$ 63.
D. SALVAGE VALUE COST	-$ 0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$ 1161.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	-25.	$ -352.	13.68	-4821.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	158.	$ 499.	17.25	8613.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		133.	$ 147.		$ 3791.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 1251.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$ 147.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$ 3791.
6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)=	3.27
(IF < 1 PROJECT DOES NOT QUALIFY)	
7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4	7.91

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: FIFTEEN
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: LIGHTING
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 15 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$ 26210.
B. SIOH	$ 1442.
C. DESIGN COST	$ 1573.
D. SALVAGE VALUE COST	-$ 0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$ 29225.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	425.	$ 5920.	11.14	65952.
B. DIST	$ .00	0.	$ 0.	11.58	0.
C. RESID	$ .00	0.	$ 0.	12.60	0.
D. NAT G	$ 3.16	0.	$ 0.	12.81	0.
E. COAL	$ .00	0.	$ 0.	12.27	0.
F. TOTAL		425.	$ 5920.		$ 65952.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)	$ -373.
(1) DISCOUNT FACTOR (TABLE A)	10.67
(2) DISCOUNTED SAVING/COST (3A X 3A1)	$ -3980.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ -3980.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 21764.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 5547.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 61972.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 2.12
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 5.27

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: CEILING INSULATION

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$ 15000.
B. SIOH	$ 825.
C. DESIGN COST	$ 900.
D. SALVAGE VALUE COST	-$ 0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$ 16725.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	145.	$ 2016.	13.68	27580.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		145.	$ 2016.		$ 27580.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)	$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90
(2) DISCOUNTED SAVING/COST (3A X 3A1)	$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$ 0.
D. PROJECT NON ENERGY QUALIFICATION TEST	
(1) 25% MAX NON ENERGY CALC (2F5 X .33)	$ 9101.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$ 2016.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$ 27580.
6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)=	1.65
(IF < 1 PROJECT DOES NOT QUALIFY)	
7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4	8.30

LIFE CYCLE COST ANALYSIS SUMMARY STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: REPLACE MEAT FREEZER EVAPORATORS
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	48000.
B. SIOH	$	2640.
C. DESIGN COST	$	2880.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	53520.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	122.	$ 1699.	13.68	23249.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		122.	$ 1699.		$ 23249.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 4500.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 58050.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$ 58050.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON-ENERGY CALC (2F5 X .33) $ 7672.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E) .58
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$ 6199.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$ 81299.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.52
(IF < 1 PROJECT DOES NOT QUALIFY)
**** Project does not qualify for ECIP funding; 4,5,6 for information only.

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 8.63

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: PLASTIC CURTAINS & SEALS
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	6250.
B. SIOH	$	344.
C. DESIGN COST	$	375.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	6969.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	54.	$ 752.	13.68	10290.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		54.	$ 752.		$ 10290.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 3396.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 752.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 10290.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.48
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 9.26

LIFE CYCLE COST ANALYSIS SUMMARY STUDY: OCCUSENS
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: COMBINATION MOTORS
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	7800.
B. SIOH	$	429.
C. DESIGN COST	$	468.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	8697.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	64.	$ 897.	13.68	12272.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		64.	$ 897.		$ 12272.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 4050.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 897.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 12272.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.41
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 9.69

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: 40 HP MOTOR

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	1800.
B. SIOH	$	99.
C. DESIGN COST	$	108.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	2007.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	27.	$ 380.	13.68	5202.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		27.	$ 380.		$ 5202.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$ 0.
D. PROJECT NON ENERGY QUALIFICATION TEST	
(1) 25% MAX NON ENERGY CALC (2F5 X .33)	$ 1717.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$ 380.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$ 5202.
6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)=	2.59

(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4	5.28

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: TWO 40 HP MOTORS

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	3600.
B. SIOH	$	198.
C. DESIGN COST	$	216.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	4014.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	27.	$ 380.	13.68	5202.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		27.	$ 380.		$ 5202.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$	0.
D. PROJECT NON ENERGY QUALIFICATION TEST		
(1) 25% MAX NON ENERGY CALC (2F5 X .33)	$	1717.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$	380.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$	5202.
6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)=		1.30

(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4		10.56

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: ONE 50 HP MOTOR

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	2100.
B. SIOH	$	116.
C. DESIGN COST	$	126.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	2342.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	34.	$ 475.	13.68	6498.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		34.	$ 475.		$ 6498.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST

(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 2144.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 475.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 6498.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 2.77

(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 4.93

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: TWO 50 HP MOTORS

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	4200.
B. SIOH	$	231.
C. DESIGN COST	$	252.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	4683.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	34.	$ 475.	13.68	6498.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		34.	$ 475.		$ 6498.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-) $ 0.

(1) DISCOUNT FACTOR (TABLE A) 12.90

(2) DISCOUNTED SAVING/COST (3A X 3A1) $ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4) $ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST

(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 2144.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE)) $ 475.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 6498.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.39

(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 9.86

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: COMBINATION HVAC/STANDBY
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$ 127063.
B. SIOH	$ 6989.
C. DESIGN COST	$ 7624.
D. SALVAGE VALUE COST	-$ 0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$ 141676.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	632.	$ 8804.	13.68	120435.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	110.	$ 348.	17.25	5996.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		742.	$ 9151.		$ 126432.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)	$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90
(2) DISCOUNTED SAVING/COST (3A X 3A1)	$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
1. SALVAGE EQUIPMENT	$ 58605.	0	1.00	58605.
d. TOTAL	$ 58605.			58605.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 58605.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 41722.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E) 1.19
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 12082.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 185037.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.31
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 11.73

LIFE CYCLE COST ANALYSIS SUMMARY STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: DOCK ENCLOSURE
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	33233.
B. SIOH	$	1828.
C. DESIGN COST	$	1994.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	37055.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	181.	$ 2521.	13.68	34492.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		181.	$ 2521.		$ 34492.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-) $ 0.
(1) DISCOUNT FACTOR (TABLE A) 12.90
(2) DISCOUNTED SAVING/COST (3A X 3A1) $ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 11382.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 2521.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 34492.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= .93
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 14.70

LIFE CYCLE COST ANALYSIS SUMMARY STUDY: OCCUSENS
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: SHUT DOWN NORTH FREEZER
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	0.
B. SIOH	$	0.
C. DESIGN COST	$	0.
D. SALVAGE VALUE COST	-$	-2000.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	2000.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	264.	$ 3684.	13.68	50402.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		264.	$ 3684.		$ 50402.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 16633.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$ 3684.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$ 50402.
6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)=	25.20
(IF < 1 PROJECT DOES NOT QUALIFY)	
7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4	.54

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: SHUT DOWN OLEO ROOM

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	0.
B. SIOH	$	0.
C. DESIGN COST	$	0.
D. SALVAGE VALUE COST	-$	-2000.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	2000.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	118.	$ 1646.	13.68	22511.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		118.	$ 1646.		$ 22511.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 0.
(1) DISCOUNT FACTOR (TABLE A).	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)	$ 0.
D. PROJECT NON ENERGY QUALIFICATION TEST	
(1) 25% MAX NON ENERGY CALC (2F5 X .33)	$ 7429.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))	$ 1646.
5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C)	$ 22511.
6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)=	11.26

(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4	1.22

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: OCCUSENS

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065

INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY

FISCAL YEAR 92 DISCRETE PORTION NAME: CEILING INSULATION

ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	15000.
B. SIOH	$	825.
C. DESIGN COST	$	900.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	16725.

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	145.	$ 2016.	13.68	27580.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	0.	$ 0.	17.25	0.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		145.	$ 2016.		$ 27580.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-) $ 0.

(1) DISCOUNT FACTOR (TABLE A) 12.90

(2) DISCOUNTED SAVING/COST (3A X 3A1) $ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4) $ 0.

D. PROJECT NON ENERGY QUALIFICATION TEST

(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 9101.

A IF 3D1 IS = OR > 3C GO TO ITEM 4

B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E)_____

C IF 3D1B IS = > 1 GO TO ITEM 4

D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE)) $ 2016.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 27580.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.65

(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 8.30

LIFE CYCLE COST ANALYSIS SUMMARY STUDY: TEN
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: CONTROL SYSTEM
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 10 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	52140.
B. SIOH	$	2868.
C. DESIGN COST	$	3129.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	58137.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	389.	$ 5419.	8.07	43729.
B. DIST	$ .00	0.	$ 0.	8.14	0.
C. RESID	$ .00	0.	$ 0.	8.79	0.
D. NAT G	$ 3.16	0.	$ 0.	8.34	0.
E. COAL	$ .00	0.	$ 0.	8.72	0.
F. TOTAL		389.	$ 5419.		$ 43729.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 3288.
(1) DISCOUNT FACTOR (TABLE A)	7.87	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 25877.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
d. TOTAL	$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 25877.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 14431.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E) 1.00
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 8707.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 69606.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.20
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 6.68

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: OVERALL ECOS
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$	283503.
B. SIOH	$	15593.
C. DESIGN COST	$	17011.
D. SALVAGE VALUE COST	-$	0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$	316107.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	1831.	$ 25506.	13.68	348920.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	243.	$ 768.	17.25	13246.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		2074.	$ 26274.		$ 362166.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 7445.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 96041.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
1. SALVAGE	$ 58065.	0	1.00	58065.
d. TOTAL	$ 58065.			58065.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 154106.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 119515.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E) 1.52
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 36622.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 516271.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.63
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 8.63

LIFE CYCLE COST ANALYSIS SUMMARY — STUDY: TWENTY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) — LCCID 1.065
INSTALLATION & LOCATION: FORT CAMPBELL REGION NOS. 4 CENSUS: 3
PROJECT NO. & TITLE: 0-4627-0070 COLD STORAGE FACILITY
FISCAL YEAR 92 DISCRETE PORTION NAME: SYNERGISTIC COMBINATION ECOS
ANALYSIS DATE: 01-18-93 ECONOMIC LIFE 20 YEARS PREPARED BY: CORRY

1. INVESTMENT

A. CONSTRUCTION COST	$ 283503.
B. SIOH	$ 15593.
C. DESIGN COST	$ 17011.
D. SALVAGE VALUE COST	-$ 0.
E. TOTAL INVESTMENT (1A + 1B + 1C - 1D)	$ 316107.

2. ENERGY SAVINGS (+) / COST (-)
ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	UNIT COST $/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL $ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	$ 13.93	1556.	$ 21675.	13.68	296515.
B. DIST	$ .00	0.	$ 0.	14.64	0.
C. RESID	$ .00	0.	$ 0.	16.00	0.
D. NAT G	$ 3.16	207.	$ 654.	17.25	11284.
E. COAL	$ .00	0.	$ 0.	15.38	0.
F. TOTAL		1763.	$ 22329.		$ 307799.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		$ 7445.
(1) DISCOUNT FACTOR (TABLE A)	12.90	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		$ 96041.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-)(4)
1. SALVAGE	$ 58065.	0	1.00	58065.
d. TOTAL	$ 58065.			58065.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4)$ 154106.

D. PROJECT NON ENERGY QUALIFICATION TEST
(1) 25% MAX NON ENERGY CALC (2F5 X .33) $ 101574.
A IF 3D1 IS = OR > 3C GO TO ITEM 4
B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1E) 1.30
C IF 3D1B IS = > 1 GO TO ITEM 4
D IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1D/(YRS ECONOMIC LIFE))$ 32677.

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) $ 461904.

6. DISCOUNTED SAVINGS RATIO (SIR)=(5 / 1E)= 1.46
(IF < 1 PROJECT DOES NOT QUALIFY)

7. SIMPLE PAYBACK PERIOD (ESTIMATED) SPB=1E/4 9.67

Ft. Campbell
Cold Storage Facility
Energy Study

APPENDIX 5

SCOPE OF WORK

January 1993

CESAM-EN-CC
Revised by CEORL-ED-M

November 1991
June 22, 1992

GENERAL SCOPE OF WORK

FOR A

LIMITED ENERGY STUDY

Cold Storage Facility, Fort Campbell,Ky.

FY92

Performed as part of the

ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)

SCOPE OF WORK
FOR A
LIMITED ENERGY STUDY
Cold Storage Facility, Fort Campbell, KY (FY 92)

TABLE OF CONTENTS

ANNEXES

1. BRIEF DESCRIPTION OF WORK: The Architect-Engineer (A/E) shall:

1.1 Perform a limited site survey of specific buildings or areas to collect ~~all~~ data required to evaluate the specific Energy Conservation Opportunities (ECO's) included in this study.

1.2 Evaluate specific ECO's to determine their energy savings potential and economic feasibility.

1.3 Provide project documentation for recommended ECO's as detailed herein.

1.4 Prepare a comprehensive report to document all work performed, the results and all recommendations.

2. GENERAL

2.1 This study is to evaluate the specific building, systems, or ECO's listed in Annex A, DETAILED SCOPE OF WORK, and if the A/E discovers new ECOs' during the site visit those will be evaluated.

2.2 The information and analysis outlined herein are considered to be minimum requirements for adequate performance of this study.

2.3 For the building, systems or ECO's listed in Annex A, all methods of energy conservation which are reasonable and practical shall be considered, including improvements of operational methods and procedures as well as the physical facilities. All energy conservation opportunities listed in Annex A shall be documented in this report. Any energy conservation opportunity considered infeasible shall also be documented in the report with reasons for elimination.

2.4 The study will analyze the existing use of electricity and natural gas. The study shall not include evaluation of alternative energy sources.

2.5 The "Energy Conservation Investment Program (ECIP) Guidance", described in letter from CEHSC-FU, dated 28 June 1991 and the latest revision from CEHSC-FU establishes criteria for ECIP projects and shall be used for performing the economic analyses of all ECO's and projects. The program, Life Cycle Cost In Design (LCCID), has been developed for performing life cycle cost calculations in accordance with ECIP guidelines and is referenced in the ECIP Guidance. If any program other than LCCID is proposed for life cycle cost analysis, it must use the mode of calculation specified in the ECIP Guidance. The output must be in the format of the ECIP LCCA summary sheet, and it must be submitted for approval to the Contracting Officer. All economic analysis associated with the ECO's can be simple payback period analysis, along with LCCID which is required for this study.

2.6 Computer modeling of the Cold Storage Facility will not be required under this study. The energy savings possible based on prior experience; the method of calculations by the A/E using methods based on prior experience; the method of calculation is subject to the approval of the Corps of Engineers and DEH at Ft. Campbell. All calculations submitted by the A/E shall clearly demonstrate the method used to derive energy savings.

2.7 Energy conservation opportunities determined to be technically and economically feasible shall be detailed in the report and ranked SIR in order of simple payback.

3. PROJECT MANAGEMENT

3.1 Project Managers. The A/E shall designate a project manager to serve as a point of contact and liaison for work required under this contract. Upon award of this contract, the individual shall be immediately designated in writing. The A/E's designated project manager shall be approved by the Contracting Officer prior to commencement of work. This designated individual shall be responsible for coordination of work required under this contract. The Contracting Officer will designate a project manager to serve as the Government's point of contact and liaison for all work required under this contract. This individual will be the Government's representative.

3.2 Installation Assistance. The Commanding Officer or authorized representative at the installation will designate an individual to assist the A/E in obtaining information and establishing contacts necessary to accomplish the work required under this contract. This individual will be the installation representative. This individual will be reponsible for providing the A/E with engineering drawings of the facility as requested, and copies of the utility rate structures.

3.3 Public Disclosures. The A/E shall make no public announcements or disclosures relative to information contained or developed in this contract, except as authorized by the Contracting Officer.

3.4 Meetings. Meetings will be scheduled whenever requested by the A/E or the Contracting Officer for the resolution of questions or problems encountered in the performance of the work. The A/E's project manager and the Government's representative shall be required to attend and participate in all meetings pertinent to the work required under this contract as directed by the Contracting Officer. These meetings, if necessary, are in addition to the presentation and review conferences. Travel costs incurred by the A/E at the Government's request, beyond those identified in the A/E's cost proposal, will be reimbursed by the Government.

3.5 Site Visits, Inspections, and Investigations. The A/E shall visit and inspect/investigate the site of the project as necessary and

required during the preparation and accomplishment of the work. Site visits shall be coordinated thru the Government representative prior to any visit to the installation by the A/E.

3.6 Records

3.6.1 The A/E shall provide a record of all significant conferences, meetings, discussions, verbal directions, telephone conversations, etc., with Government representative(s) relative to this contract in which the A/E and/or designated representative(s) thereof participated. These records shall be dated and shall identify the contract number, and modification number if applicable, participating personnel, subject discussed and conclusions reached. The A/E shall forward to the Contracting Officer within ten calendar days, a reproducible copy of the records.

3.6.2 The A/E shall provide a record of requests for and/or receipt of Government-furnished material, data, documents, information, etc., which if not furnished in a timely manner, would significantly impair the normal progression of the work under this contract. The records shall be dated and shall identify the contract number and modification number, if applicable. The A/E shall forward to the Contracting Officer within ten calendar days, a producible copy of the record of request or receipt of material.

3.7 Interviews. The A/E and the Government's representative shall conduct entry and exit interviews with the Director of Engineering and Housing before starting field work at the installation and after completion of the field work. The Government's representative shall schedule the interviews at least one week in advance. Entry and exit interviews, for the purposes of this proposal, are presumed to be informal and less than two hours each in duration.

3.7.1 Entry. The entry interview shall describe the intended procedures for the survey and shall be conducted prior to commencing work at the facility. As a minimum, the interview shall cover the following points:

a. Schedules.

b. Names of energy analysts who will be conducting the site survey.

c. Proposed working hours.

d. Support requirements from the Director of Engineering and Housing.

3.7.2 Exit. The exit interview shall be at the conclusion of the site visit and shall briefly describe the items surveyed and probable areas of energy conservation. The interview shall also solicit input and advice from the Director of Engineering and Housing.

4. SERVICES AND MATERIALS. All services, materials (except those specifically enumerated to be furnished by the Government), plant, labor, supervision and travel necessary to perform the work and render the data required under this contract are included in the lump sum price of the contract.

5. PROJECT DOCUMENTATION. All energy conservation opportunities which the A/E has considered shall be included in one of the following categories and presented in the report as such:

5.1 ECIP Projects. To qualify as an ECIP project, an ECO, or several ECO's which have been combined, must have a construction cost estimate greater than $300,000, and a simple payback period of less than eight years. For ECAM projects, the $300,000 limitation may not apply; in such cases,the A/E shall check with the installation for guidance. The overall project and each discrete part of the project shall have an SIR greater than one.

Programming documentation shall consist of a DD Form 1391, and life cycle cost analysis (LCCA) summary sheet(s)(with necessary backup data to verify the numbers presented), and one such DD Form 1391 can combine a number of projects in order to meet a dollar minimum limitation of a $300,000 project criteria. A life cycle cost analysis summary sheet shall be developed for each ECO and for the overall project when more than one ECO are combined. The energy savings for projects consisting of multiple ECO's must take into account the synergistic effects of the individual ECO's. The energy savings analysis will address the energy savings of each individual ECO; the study shall not address the synergistic effects of interaction of ECO'S on one another.

5.2 Nonfeasible ECO's. All ECO's which the A/E has considered but which are not feasible, shall be documented in the report with reasons or economic justifications showing why they were rejected.

6. DETAILED SCOPE OF WORK. The Detailed Scope of Work is contained in Annex A.

7. WORK TO BE ACCOMPLISHED.

7.1 Perform a Site Survey. The A/E shall obtain all necessary data to evaluate the ECO's or projects by conducting a site survey. However, the A/E is encouraged to use any data that may have been documented in a previous study. The A/E shall document his site survey on forms developed for the survey, or standard forms, and submit these completed forms as part of the report. All test and/or measurement equipment shall be properly calibrated prior to its use.

7.2 Evaluate Selected ECO's. The A/E shall analyze the ECO's listed in Annex A. These ECO's shall be analyzed in detail to determine their feasibility. The analysis will include a system description, an estimated construction cost, the projected annual

energy savings, and the simple payback period calculation. Savings to Investment Ratios (SIRs) shall be determined using current ECIP guidance. The A/E shall provide all data and calculations needed to support the recommended ECO. All assumptions and engineering equations shall be clearly stated. Calculations shall be prepared showing how all numbers in the ECO were figured. Calculations shall be an orderly step-by-step progression from the first assumption to the final number. Descriptions of the products, manufacturers catalog cuts, pertinent manufacturers drawings and sketches shall also be included. The A/E will include simple/single line sketches/drawings that assist in depicting the project directioning for the study, however, they are not intended to be in regards to design liability. A life cycle cost analysis summary sheet shall be prepared for each ECO and included as part of the supporting data, and those other ECOs' recommended by the A/E.

7.3 Combine ECO's Into Recommended Projects. During the Interim Review Conference, as outlined in paragraph [7.5.1], the A/E will be advised of the DEH's preferred packaging of recommended ECO's into projects. Some projects may be a combination of several ECO's, and others may contain only one. These projects will be evaluated and arranged as outlined in paragraphs 5.1, and 5.2. The project packages will allow the DEH to further develop their energy management plan for this facility.

7.4 Submittals, Presentations and Reviews. The work accomplished shall be fully documented by a comprehensive report. The report shall have a table of contents and shall be indexed. All pages shall be numbered. Names of the persons primarily responsible for the project shall be included. The A/E shall give an informal presentation of the interim submittal to installation, command, and other Government personnel at the DEH offices during the interim submittal review. During the presentation, the personnel in attendance shall be given ample opportunity to ask questions and discuss any changes deemed necessary to the study. A review conference will be conducted the same day, following the presentation. Each comment presented at the review conference will be discussed and resolved or action items assigned. The Interim 60% presentation and review conference will require no more than one working day. The presentation and 60% interim review conference will be at the installation DEH offices on the date agreeable to the Director of Engineering and Housing, the A/E and the Government's representative. The Contracting Officer may require a resubmittal of any document(s), if such document(s) are not approved because they are determined by the Contracting Officer to be inadequate for the intended purpose.

7.5.1 Interim Submittal. An interim 60% report shall be submitted for review after the field survey has been completed and an analysis has been performed on all of the ECO's. The A/E shall submit the interium 60% review report directly to ~~the Installation~~, MACOM, and COE, and then the reviewers will have a two week period to submit their comments directly back to the A/E along with their submittal of those

comments to the COE. The Interim review meeting at the installation will be scheduled within two-three weeks after the interim report submittal has been received by the A/E by all reviewers. The report shall indicate the work which has been accomplished to date, illustrate the methods and justifications of the approaches taken and contain a plan of the work remaining to complete the study. Calculations showing energy and dollar savings, SIR, and simple payback period of all the ECO's shall be included. The results of the ECO analyses shall be summarized by lists as follows:

a. All ECO's eliminated from consideration shall be listed with reasons for their elimination as discussed in para. 5.2.

b. All ECO's which were analyzed shall be grouped into two listings, recommended and non-recommended, each arranged in order of descending SIR and simple payback period.

The A/E shall submit the Scope of Work and any modifications to the Scope of Work as an appendix to the report. A narrative summary describing the work and results to date shall be a part of this submittal. At the Interim Submittal and Review Conference, the Government's and A/E's representatives shall coordinate with the Director of Engineering and Housing to provide the A/E with direction for packaging or combining ECO's. The survey forms completed during this audit shall be submitted as part of the interim report.

7.5.2 Final Submittal. The A/E shall prepare and submit the final report when all sections of the report are 100% complete and all comments from the interim submittal have been resolved. The A/E shall submit the Scope of Work for the study and any modifications to the Scope of Work as an appendix to the submittal. The report shall contain a narrative summary of conclusions and recommendations, together with all raw and supporting data, methods used, and sources of information. The report shall integrate all aspects of the study. The recommended projects, as determined in accordance with paragraph 5, shall be presented in order of priority by SIR and simple payback period. The lists of ECO's specified in paragraph [7.5.1] shall also be included for continuity. The final report and all appendices shall be bound in standard three-ring binders which will allow repeated disassembly and reassembly. The final report shall be arranged to include:

a. An Executive Summary to give a brief overview of what was accomplished and the results of this study using graphs, tables and charts as much as possible (See Annex B for minimum requirements).

b. The narrative report describing the problem to be studied, the approach to be used, and the results of this study.

c. Documentation for the recommended projects (includes LCCA Summary Sheets).

d. Appendices to include as a minimum:

1) Energy cost development and backup data

2) Detailed calculations

3) Cost estimates

4) Scope of Work

5) Economic Analysis of Alternatives

The Final Report will be submitted 100% a complete. A review meeting/presentation will not be scheduled. An additional meeting may be scheduled in accordance with paragraph 3.4.

LOUISVILLE DISTRICT CORPS OF ENGINEERS
ENGINEERING DIVISION, A/E MANAGEMENT BRANCH (CEORL-ED-M)

ANNEX A
DETAILED SCOPE OF WORK
June 22, 1992

1. PROJECT NAME & LOCATION: A Limited Energy Study, FY92 EEAP, Cold Storage Facility (Bldg.#5202), Kansas Avenue between 8th & 11th Streets, Fort Campbell, Kentucky, an existing building that consists of 29,300 square feet.

2. GENERAL SOW vs. DETAILED SOW: The General Scope of Work(SOW) will apply to contract efforts as modified by the Detailed SOW. Should conflicts occur between the General SOW and Detailed SOW, the Detailed SOW shall govern.

3. RESPECTIVE POC's for this STUDY:

Louisville District COE- Charles (Chuck) Lockman/CEORL-ED-M
(502) 582-6041 or FAX 5281

Fort Campbell,Ky. DEH- Arlin E. Wright/Supv. Industrial Engr.
DEH-MESB (502) 798-8895 or
FAX 9596

Architect/Engineer(A/E)- , A/E Project Manager
( ) or FAX

4. SCOPE:

4.1. The A/E shall provide all work necessary to complete the Limited Energy Study as defined by the General Scope of Work including the Annexes. Information and instructions contained within the Detailed SOW are provided as a means for the A/E Project Manager to expand or modify the General SOW as may be needed to suit the study for the Cold Storage Facility at Fort Campbell. This Limited Energy Study is much more flexible than the standard EEAP Study and is meant to address specific opportunities, buildings or systems that the installation feels have high potential for energy or dollar savings.

4.2. The study will consider the architectural envelope, boilers, alternative refrigerant replacement, industrial equipment, operation of the facility by the Using Agency, material, utilities and other components of the industrial operation, and determine any energy savings methods/recommendations, energy savings operational methods, systems energy savings requirements, loading dock equipment, hardware, existing geri-rigging of systems/equipment, and all operations et.al. that could realize energy savings. This includes interview of DOL personnel to gather data for quantities, and operational data.

Alternate energy sources such as solar, wind, geothermal, will not be included.

4.3 The study will consider new designs/etc. for energy trends that make the cold storage facility more cost effective and energy saving.

4.4 The A/E shall assist DEH in arranging for the installation of electrical metering of the cold storage facility for a period not to exceed two weeks, for each of the two service entrances. TVA personnel at no cost to the Government or to the A/E will install electrical metering at the facility, however the A/E will notify TVA by letter the request to install metering. The metering is intended to analyze the KWH consumption, power factor, and electrical demand peaks over the period of time that it is installed. Natural gas will not be metered, due to the high cost of metering and the insignificant usage of natural gas within the cold storage warehouse.

5. DETAILED REQUIREMENTS: All detail requirements selected at Fort Campbell for the purpose of this study, shall specifically include the special facility and projects identified by the DEH staff. In general the facility and projects, when investigated relative to the ECO's provided in Figure A-5.1, shall comprise the bulk of suggestive items normally investigated for a Cold Storage Facility.

Specific Energy Conservation Opportunities (ECO) Checklist: Each ECO provided in the list in Figure A-5.1 shall be investigated as a minimum, however if others found during the investigation are good candidates they shall also be included and evaluated.

6. PERFORMANCE: The total time required for completion of the study and the performance of all work shall not be more than 120 calendar days from the date of Notice To Proceed (NTP) for the Delivery Order. If the study takes the A/E less time than scheduled to achieve, a shortened schedule for submittal and coordination of review and interium review meeting at the installation may be coordinated by the A/E with all parties involved in the review process. Figure A-6.1 is a schedule of pertinent events and milestone dates for acceptable performance of the study at Fort Campbell, subject to a possible shortened schedule as mentioned previously.

Changes or adjustments made to the SOW during the term of the project study shall be made by the Louisville District.

7. SUBMITTALS: The A/E's Project Manager shall provide direct distribution of all required submittals and documents in the numbers as listed in Figure A-7.1.

8. GOVERNMENT-FURNISHED INFORMATION: The following list of reference documents will be furnished to the A/E:

a. Energy Conservation Investment Program (ECIP) Guidance, dated 28 June 1991.

b. Mechanical Refrigeration and Ventilation in Cold-Storage Facilities, TM 5-810-3, date August 1982, including Change #1, dated 31 Aug.84

c. One set of 35mm photographs of the existing building exterior and interior, 23 January 1992.

d. As-built Floor Plan, Q.M. Cold Storage and Meat Cutting Plant, dated Sept. 1964 , drawing no. 33-04-02, sheet 7.

e. Other drawings identifying building modifications are at the EP&S Office, Bldg. #865 on Micro-Fiche.

f. Existing Conditions Maps, sheet 11, of the Master Plan.

g. ETL 1110-3-282, Energy Conservation, dated 10 Feb. 1978.

h. TM 5-785, Engineering Weather Data.

i. AR 5-4, Change No.1, Department of the Army Productivity Improvement Program.

j. AR 415-15, 1 Jan 84, Military Construction,Army(MCA)Program Development.

k. Other engineering drawings of the cold storage warehouse, as requested by the A/E: Current building plans and sections. As a minimum, the wall sections, roof and all interior walls, refrigerated areas of the building. The sections should clearly show insulation, materials of construction, and any revisions to the building completed to date. List of equipment installed in the building relating to current maintenance activities, replacements or new equipment that has been installed.

l. Utility rate structures and current prices for natural gas and electricity: Electrical rate structure for post and/or building, current prices paid for electricity, natural gas rate structure for post and/or building, current price paid for natural gas.

9. <u>LCCID, A COMPUTER PROGRAM:</u> A computer program titled Life Cycle Costing in Design (LCCID) is available from the BLAST Support Office in Urbana, Illinois, for a nominal fee. This computer program will be used for performing the economic calculations for ECIP and non-ECIP ECO's. LCCID permits the designer to perform an economic study that conforms to the economic criteria all three services. POC is Linda Lawrie. The A/E is encouraged to obtain and use this computer program. The BLAST Support Office can be contacted at 144 Mechanical Engineering Building, 1206 West Green Street, Urbana, Illinois 61801. The

telephone number is (217) 333-3977 or (800) 842-5278. All economic analysis can be performed using simple payback period, however, life cycle cost analysis will be required for the Government information.

10. SIMULATION PROGRAMS: No computer simulation will be required under this project.

Figure A-5.1 ECO's- The following list of ECO's represents a minimum list that the A/E shall investigate. Other ECO's which are discovered by the A/E during the site visit shall be fully investigated and documented in accordance with the procedures detailed with this SOW:

Building heat loss/gain investigation:

0 Insulation, thickness, and type.

0 Envelopes for various refrigeration compartments.

Operations Investigation:

0 Loading dock procedure.

0 Freezer doors, closure, seals, type, size, speed, and location.

0 Material handling (fork lift, other) no., size, and type.

0 Material storage methods (containers, boxes, and palette).

0 Dock enclosure with cooling and loading dock seals (air curtains, or plastic films).

0 System operational procedures.

Mechanical Investigation:

0 Refrigerant, chlorflouracarbon, and ammonia.

0 Equipment location pursuant to efficient distribution.

0 Refrigerant cooling methods.

0 Evaporators size and location.

0 Distribution piping insulation (thickness and type).

0 Modernized control system(s).

0 Compressor, size, type, and efficiency.

0 Refrigerant storage, size, location, and insulation.

Figure A-5.1 continued-GENERAL ENERGY CONSERVATION OPPORTUNITIES, Limited Energy Study, EEAP FY92, Cold Storage Facility, Fort Campbell, Ky to be investigated:

0 Insulation (wall, roof, pipe, duct, etc.).

0 Insulated panels.

0 Shutdown energy to hot water heaters or modify controls.

0 Energy conserving lighting, reduction of levels, replacement of incandescent, and more efficient lighting source.

0 Improve power factor.

0 High efficiency motor replacement.

0 Heat reclaim from hot refrigerant gas.

0 Install peak shaving/energency generator

0 Transformer loading.

0 Revise or repair building HVAC controls.

0 Occupancy sensors to control lighting or HVAC.

0 Reduce space requirements and supplies.

Note: If some of the ECO's on pages 1 & 2 can be combined into one ECO, the A/E may work those together as one ECO in the report.

A general, narrative discussion of the office and administration (Rooms 121 and 122 on the building plan) will be included to summarize the condition of the area.

Figure A-6.1. Schedule for the Limited Energy Study, FY 92 EEAP, Fort Campbell:

Item	Calendar Days	Actual Date
1. RFP(Request for Proposal)to (the initial)A/E		14 May 1992
2. Site (Concept) Survey/Scope Mtg./Entry/Exit (with the initial A/E)	*	16/17Jun1992
3. Notice to Proceed Received by A/E	1	
4. 60% Submittal-Interim Report for Review	60	
5. Review period by DEH, MACOM, & COE/ submittal back to A/E & COE		
6. 60% Interium Review Meeting @ Ft.Campbell	*90	
7. 100% Final Submittal	120	

* Denotes meeting to be held at the Installation site.

Figure A-7.1. Distribution of Submittals: The A/E shall make direct submittal and responses to comments as indicated by the following schedule:

Organization	Correspondence	Executive Summary	Reports	Fieldnotes
Commander,US Army Engineer District,Louisville ATTN: CEORL-ED-M/Charles Lockman P.O. Box 59 Louisville, Ky. 40201-0059 (tel. 502-582-6041, or FAX 5281)	1	1	1	1*
HQ 101 Abn Div (AASLT)& Ft Campbell ATTN: AFZB-DE-R-M/Arlin E. Wright 16th & Ohio, Bldg. T-865 (DEH) Fort Campbell, Ky. 42223-1291 (tel. 502-798-8895, or FAX 9596)	1	1	1	1*
Headquarters FORSCOM (MACOM) ATTN: FCEN-RDF/Naresh Kapur Fort McPherson, Ga. 30330-6000 (tel. 404-669-6731, or FAX 7751)	1	1	1	1*
COMMANDER, US Army Engineer District, Mobile ATTN: CESAM-EN-CC/Tony Battaglia (EEAP TCX) P.O. Box 2288 Mobile, Al. 36628-0001 (tel. 205-690-2618, or FAX 2424)	1	1**	1 (final only)	0
COMMANDER,US Army Engineer Division,Ohio River ATTN: CEORD-DL-M/Joe Semrad P.O. Box 1159 Cincinnati, Oh. 45201-1159	0	1**	0	0
COMMANDER,US Army Engineer Div.,S.Atlantic ATTN: CESAD-EN-TE/John Baggette 77 Forsyth Street, S.W. Atlanta, Ga. 30335-6801	0	1**	0	0
COMMANDER,US Army Corps of Engineers ATTN: CEMP-ET/Dan Gentil (EEAP Program Mgr) 20 Massachusetts Avenue Washington, D.C. 20314-1000 (tel. 202-272-0430)	0	1**	0	0

COMMANDER,US Army Logistics Evaluation Agency ATTN: LOEA-PL/Mr. Keath New Cumberland Army Depot New Cumberland, Pa. 17070-5006	0	1**	0	0

* Field Notes submitted in final at Interim submittal.
** Submit copies of the final Executive Summary only.

ANNEX B

EXECUTIVE SUMMARY GUIDELINE

1. Introduction.

2. Building Data (type, size,, etc.)

3. Present Energy Consumption of Buildings or Systems Studied.

   o Total Annual Energy Used.

   o Source Energy Consumption.

   Electricity - KWH, Dollars, BTU
   Natural Gas - THERMS, Dollars, BTU

4. Energy Conservation Analysis.

   o ECO's Investigated.

   o ECO's Recommended.

   o ECO's Rejected. (Provide economics or reasons)

   o Operational or Policy Change Recommendations.

   * Include the following data from the life cycle cost analysis summary sheet: energy analysis: the cost (construction plus SIOH), the annual energy savings (type and amount), the annual dollar savings, the SIR, the simple payback period and the analysis date.

5. Energy and Cost Savings.

   o Total Potential Energy and Cost Savings.

   o Percentage of Energy Conserved.

   o Energy Use and Cost Before and After the Energy Conservation Opportunities are Implemented. (Considering the sum total of individual ECO's, and not the interaction between ECO's)

ANNEX C

REQUIRED DD FORM 1391 DATA

To facilitate ECIP project approval, the following supplemental data shall be provided:

a. In title block clearly identify projects as "ECIP."

b. Complete description of each item of work to be accomplished including quantity, square footage, etc.

c. A comprehensive list of buildings, zones, or areas including building numbers, square foot floor area, designated temporary or permanent, and usage (administration, patient treatment, etc.).

d. List references, and assumptions, and provide calculations to support dollar and energy savings, and indicate any added costs.

(1) If a specific building, zone, or area is used for sample calculations, identify building, zone or area, category, orientation, square footage, floor area, window and wall area for each exposure.

(2) Identify weather data source.

(3) Identify infiltration assumptions before and after improvements.

(4) Include source of expertise and demonstrate savings claimed. Identify any special or critical environmental conditions such as pressure relationships, exhaust or outside air quantities,temperatures, humidity, etc.

e. Claims for boiler efficiency improvements must identify data to support present properly adjusted boiler operation and future expected efficiency. If full replacement of boilers is indicated, explain rejection of alternatives such as replace burners, nonfunctioning controls, etc. Assessment of the complete existing installation is required to make accurate determinations of required retrofit actions.

f. Lighting retrofit projects must identify number and type of fixtures, and wattage of each fixture being deleted and installed. New lighting shall be only of the level to meet current criteria. Lamp changes in existing fixtures is not considered an ECIP type project.

g. An ECIP life cycle cost analysis summary sheet as shown in the ECIP Guidance shall be provided for the complete project and for each discrete part included in the project. The SIR is applicable to all segments of the project. Supporting documentation consisting of basic engineering and economic calculations showing how savings were determined shall be included.

h. The DD Form 1391 front sheet shall include, for the complete project, the annual dollar and MBTU savings, SIR, simple amortization period and a statement attesting the building and retrofit actions will be in active use throughout the amortization period. DD Form 1391 shall be IAW AR 415-15. Provide hardcopy and a computer diskette.

i. The fiscal year in which the cost was calculated shall be clearly shown on the DD Form 1391.

j. Nonappropriated funded facilities will not be included in an ECIP project without an accompanying statement certifying that utility costs are not reimbursable.

k. Any requirements required by ECIP guidance dated 25 April 1988 and any revisions thereto. Note that unescalated costs/savings are to be used in the economic analyses.

l. The five digit category number for all ECIP projects except for Family Housing is 80000. The category code number for Family Housing projects is 71100.

GLOSSARY OF ACRONYMS

A/E	Architect Engineer
AR	Army Regulation
DEH	Director of Engineering and Housing
DOD	Department of Defense
DSOW	Detailed Scope of Work
ECAM	Energy Conservation and Management
ECIP	Energy Conservation Investment Program
ECO	Energy Conservation Opportunity
EEAP	Energy Engineering Analysis Program
EHSC	Engineering and Housing Support
EMCS	Energy Monitoring and Control System
ESOS	Energy Savings Opportunity Survey
GSOW	General Scope of Work
HQUSACE	Headquarters, US Army Corps of Engineers
LCCA	Life Cycle Cost Analysis
LCCID	Life Cycle Cost In Design
MACOM	Major Army Command
MCA	Military Construction Army
NECPA	National Energy Conservation Policy Act
OSD PIF	OSD Productivity Investment Funding
PCIP	Productivity Capital Investment Program
PDB	Project Development Brochure
PECIP	Productivity Enhancing Capital Investment Program
QRIP	Quick Return on Investment Program
SIR	Savings Investment Ratios
TCX	Technical Center of Expertise

RELEASE OF CLAIMS

The undersigned architect-engineer firm, under Contract No. _____, dated _____, 19__, between the United States of America and said architect-engineer for _____, located at _____, in accordance with the "Payment" clause of said contract, hereby releases the United States, its officers, agents, and employees from any and all claims arising under or by virtue of said contract or any modification or change thereof except with respect to those claims, if any, listed below:

Executed this _____ day of _____, 19___.

_____
(signature)

_____
(title)

Witness:

_____

_____
(address)

_____

_____
(address)

Ft. Campbell
Cold Storage Facility
Energy Study

APPENDIX 6

FIELD NOTES

January 1993

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1130

STORAGE ROOM DATA SHEET

Storage room name: PC2 Fresh Fruits & Vegetables PC2-EX

Products stored: Cabbage, Lettuce, Carrots, Lemons, Apples, Tomato

Room Length (ft): 44 Width (ft): 23 Area (ft^2): ~ 1008

Design Temperature (°F): 35 - 40 Actual Temperature (°F): 39

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10' - 6" Wood racks against walls

Estimated amount of food stored: 12 pallets

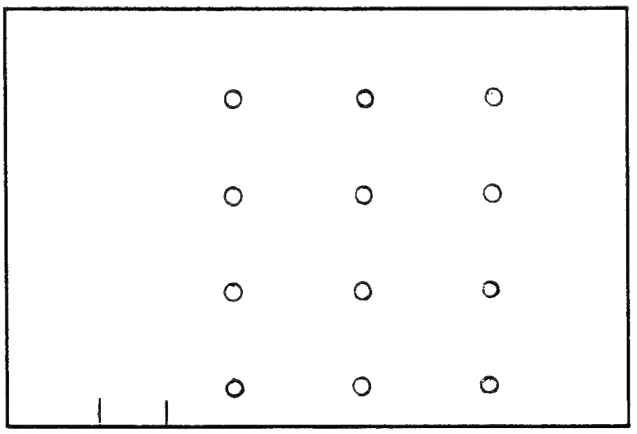
Equipment in Room and Type: 2

Number of Lights: 12 Hooded Wattage per bulb: 100

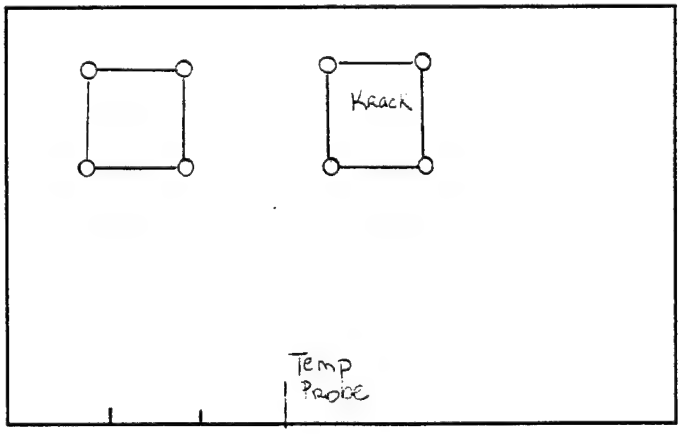
Number of Doors: 1 Door Type: _____

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) KRACK - Fan motor 3HP, 9.2 Amp start, 4.6 Amp Run, 220 V.
Circulation model # CP 1326-6 Chiller 3HP., 3ph, 7amp. 220V.

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1115

STORAGE ROOM DATA SHEET

Storage room name: M-F Frozen Meats, Poultry, Seafood MF-1-EX

Products stored: Turkeys, Corn Dogs, Steaks, Patties, Roasts, Fish

Room Length (ft): 82 Width (ft): 37 Area (ft^2): ~ 3034

Design Temperature (°F): 0 to -10 Actual Temperature (°F): 6

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10' - 2"

Estimated amount of food stored: 69

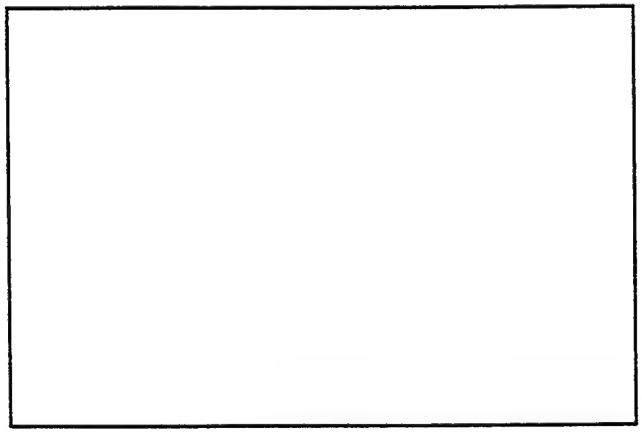
Equipment in Room and Type: _____

Number of Lights: 36 Incan (Shaded) 4 rows Wattage per bulb: _____

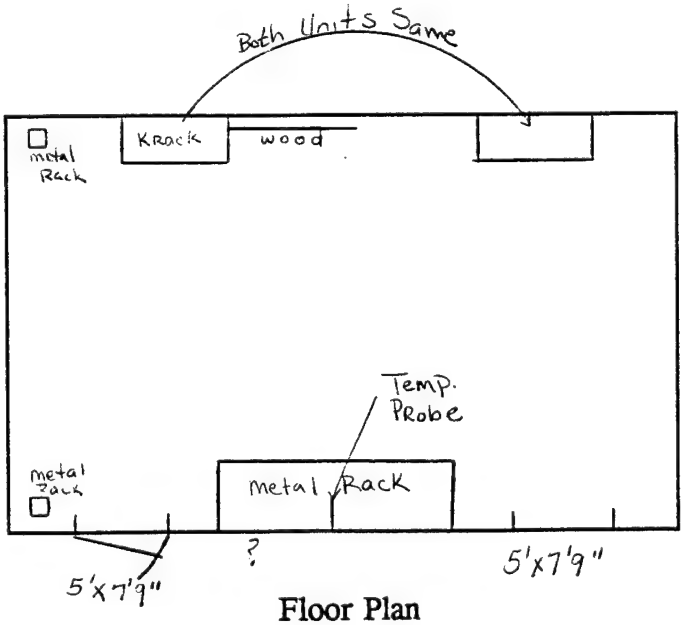
Number of Doors: 2 w/curtains Door Type: _____

* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) KRack → 1-30 tm Heaters, 220v; 3ph;
Wood Racks Against Wall 1-Can 220v, 3ph, 30 amp
Include North Arrow. Blower Motor 7½ Hp; 220v, 3ph, 20amp start, 10 Amp Run



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJB / RWW
Date: 9/11/92 Time: 1135

STORAGE ROOM DATA SHEET

Storage room name: Issue Room ISSRM-EX

Products stored: Staging Room - Breads, Milk

Room Length (ft): ~82' Width (ft): ~21' Area (ft^2): 1737

Design Temperature (°F): _____ Actual Temperature (°F): _____

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10' - 6" with meat racks

Estimated amount of food stored: _____

Equipment in Room and Type: 2 units

Number of Lights: 20 2 rows 10 ea. Wattage per bulb: 100

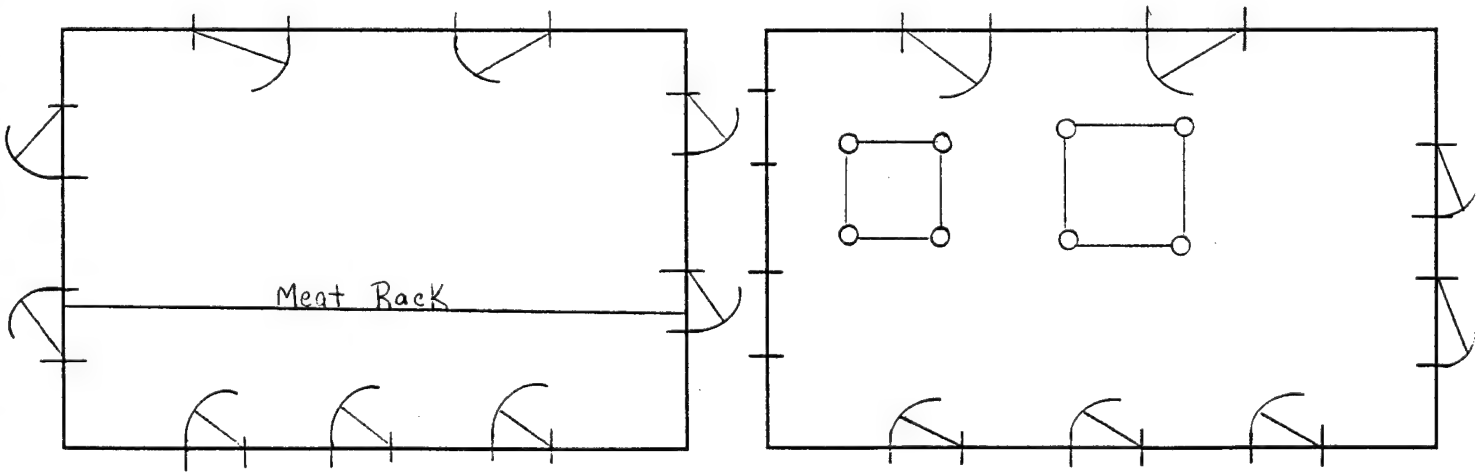
Outside
Number of Doors: 4 - 5'-3" x 7'-9" Door Type: _____

Door Blowers in Op.

* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Chillers same as PCS Room
Two doors on East side NOT USED
One door on west is used w/ w/o self-closer

Include North Arrow.



Ceiling Plan Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1420

STORAGE ROOM DATA SHEET

Storage room name: C-4 Mini Mart Produce (former Meat Mart) G4MM-EX
Cabbage
Products stored: Apples, Canned Ham, Carrots, Idaho Potatoes, Celery, Lemons, Oranges

Room Length (ft): 38 Width (ft): 19.5 Area (ft^2): 745

Design Temperature (°F): _____ Actual Temperature (°F): 48 / 45.7

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-3"

Estimated amount of food stored: 6 pallets

Equipment in Room and Type: _____

Number of Lights: 8 Incan Wattage per bulb: 100 watt

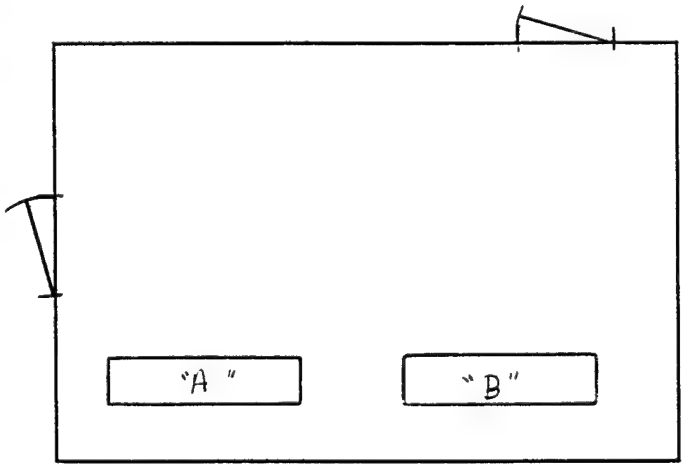
Number of Doors: _____ Door Type: _____

* Detail Blowers and Evaporators on Reverse*

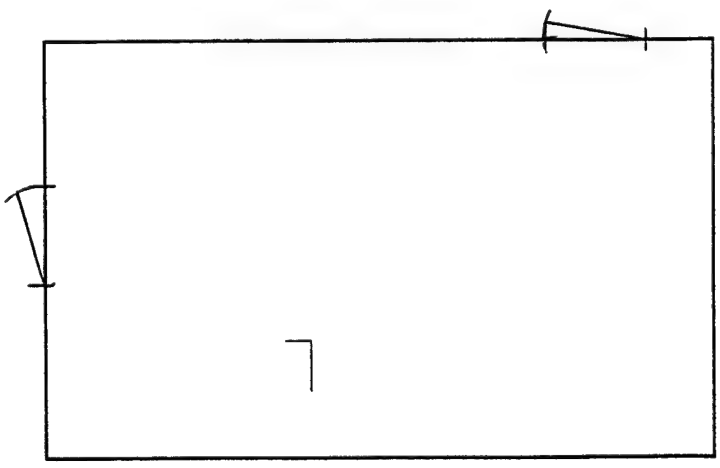
Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.

KRack Mod # SS-244-170-EDL-DXF
Unit "B" SER# 356531, 2 Fans 15 Amp
Unit "A" Heater 5600 Watts, 24.3 Amps
→ Same as other produce



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR
Date: 9/11/92 Time: 1015

STORAGE ROOM DATA SHEET

Storage room name: Crushed Ice

Products stored: C. Ice

Room Length (ft): _____ Width (ft): _____ Area (ft^2): 270.16

Design Temperature (°F): _____ Actual Temperature (°F): 32/36/36

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10.5'

Estimated amount of food stored: 6.5 2000 lb Pallets (Loading app. 40% of capacity)

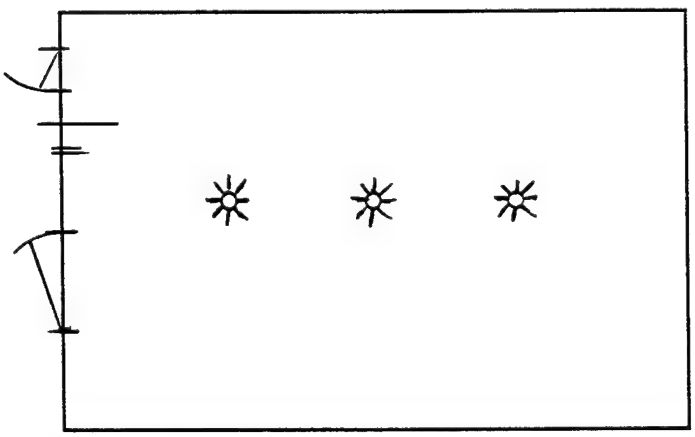
Equipment in Room and Type: Krack, Chicago Sea# 81414 Model BUC 2100ED
2 motors ¼ HP 230V - 1 Phase 2.5 amp ea.

Number of Lights: 3 Wattage per bulb: 100est.

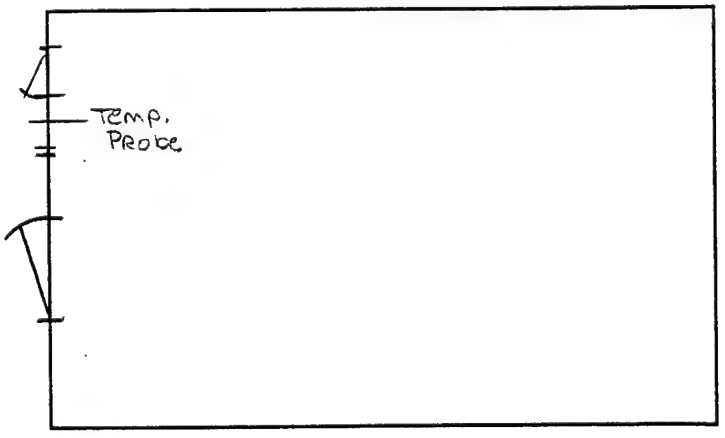
Number of Doors: 2: Air curtain on large Door Type: Chase Ind. ser 2428

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Ceiling Sweating @ Time of visit.

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 0830

STORAGE ROOM DATA SHEET

Storage room name: North Storage Staging NSS-EX

Products stored: Stable Milk, extra Pallets, Forklifts, carts, misc. dry goods

Room Length (ft): 113' Width (ft): 17' Area (ft^2): ~ 1921

Design Temperature (°F): _____ Actual Temperature (°F): Ambient

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-8"

Estimated amount of food stored: 58 tons (58 pallets @ 2000) 43.5 ft^3

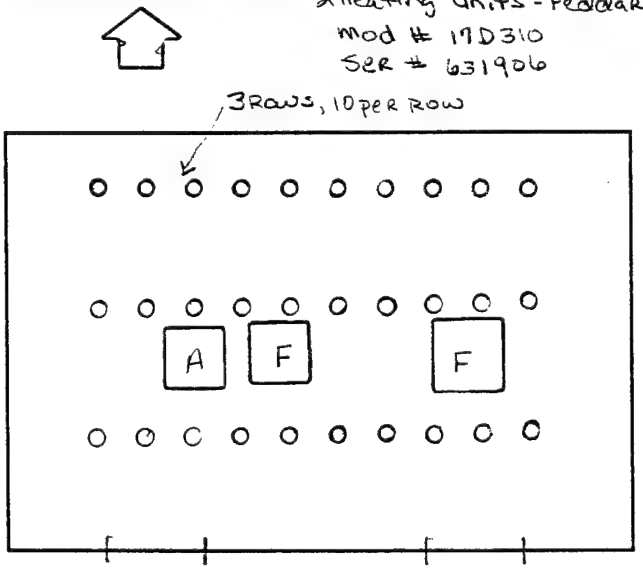
Equipment in Room and Type: Heating Units Only

Number of Lights: 30 - 12 w/covers, 18 w/hoods Wattage per bulb: 100

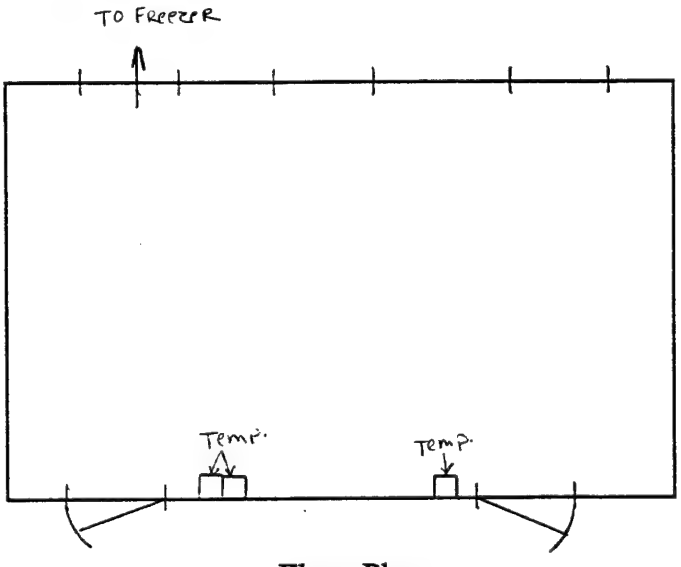
Number of Doors: 2 to Breezeway, 3 to Freezers Door Type: _____

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) 14½ wall thickness Total, 3" of Wall Insul.
Insulation - Plaster over wire lathe over ~2" stryofoam

Include North Arrow. 2 Heating Units - Feddars 110V. Fan.
Mod # 19D310
Ser # 631906



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1145

STORAGE ROOM DATA SHEET

Storage room name: VF2 Frogen Vegs, Fruits, Juices VF2-EX

Products stored: Pizza, Waffles, Butter, Cheese, Frozen Juice, Hash Browns, French Fries, Pie Crusts

Room Length (ft): 44 Width (ft): 27 Area (ft^2): ~ 1176

Design Temperature (°F): 0 to -10 Actual Temperature (°F): 3

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-6" Ceiling repair near units wood racks against walls

Estimated amount of food stored: 39 Pallets

Equipment in Room and Type: _____

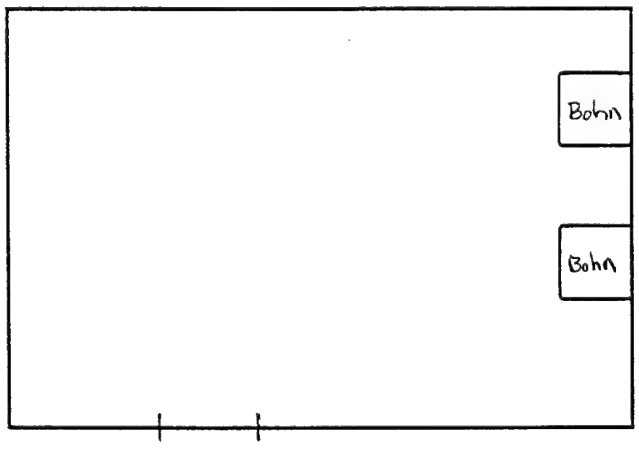
Number of Lights: 12 Wattage per bulb: 100

Number of Doors: 1 w/air curtains 5'-8" x 7'-9" Door Type: Jamison Mod# UCBC 5 amp, 600 watt heater

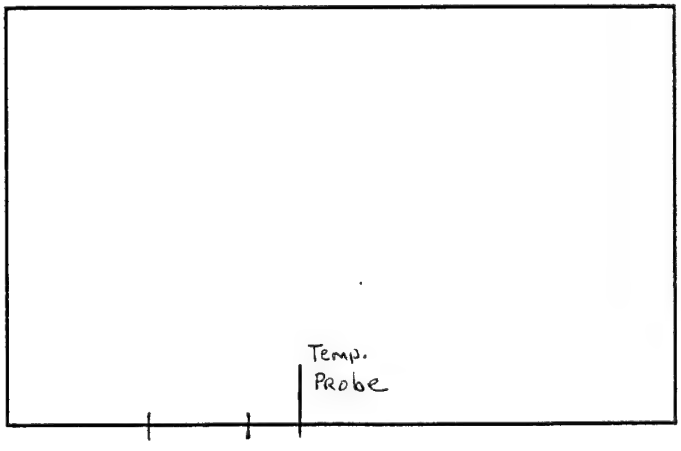
---

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Bohn - Mod# 2400 EL-2 230V.
Ser# 864355 805414
Heater - 3ph, Amp 22.8 Amps
Fan - 3 Amp, 1ph

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1000

STORAGE ROOM DATA SHEET

SFRE-EX

Storage room name: South Freezer - Non Operable Lingle Model #400 11-09-277

Products stored: n/a

Room Length (ft): 39'-6" Width (ft): 20'-8" Area (ft^2): ~ 817

Design Temperature (°F): ? Actual Temperature (°F): Ambient

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 9'-6"

Estimated amount of food stored: none

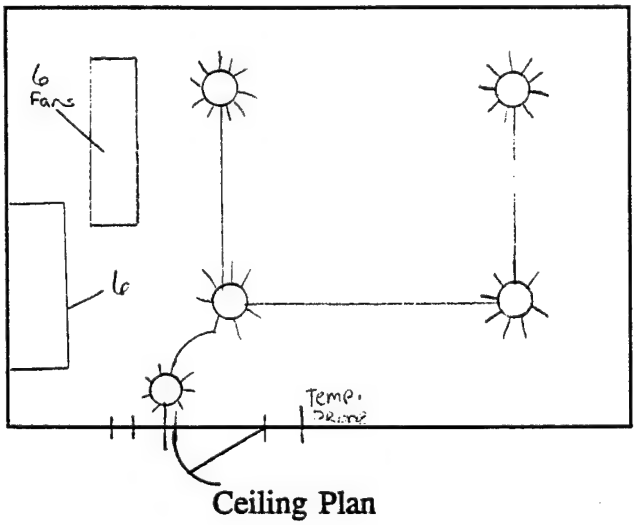
Equipment in Room and Type: _____

Number of Lights: 5 Wattage per bulb: 100

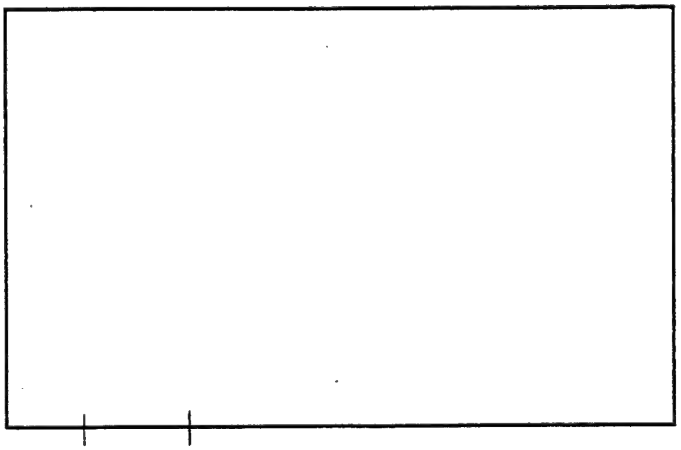
heater
Number of Doors: 1:Mod #34 120v. 2.48 amps Door Type: C.M. Lingle/ 5'-7'

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Mfg → Russell Brea, Ca.
Blowers: 1amp per blower, 1 ph. 230 v. model # HE 06-280
Heater: 3ph, 230V., 22.6 amps
Outside wall thickness 2½"

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR
Date: 9/11/92 Time: 1020

STORAGE ROOM DATA SHEET

Storage room name: Shortening & Olea, Yeast C-1-EX
Hershey Chocolate Chips
Products stored: Shortening, Olea, Yeast, Mustard, Jelly, Syrup, Salad dressing

Room Length (ft): ~23' Width (ft): 19'-8" Area (ft^2): 466.01

Design Temperature (°F): 35 - 42 Actual Temperature (°F): 53

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-3"

Estimated amount of food stored: 12 Pallets @ 2400 /lbs

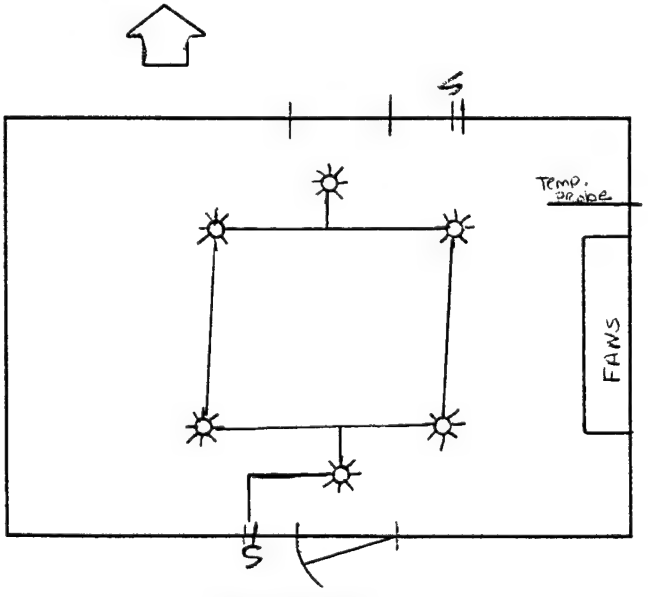
Equipment in Room and Type: _____

Number of Lights: 6 Inc. Unshaded Wattage per bulb: 100

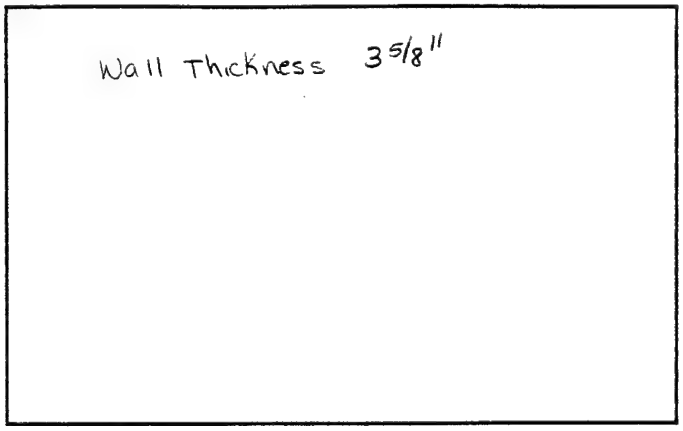
Number of Doors: 2 Door Type: Gloeker, Erie PA

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Bohn - 5 fans

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 0930

STORAGE ROOM DATA SHEET

Storage room name: V.F. 1 / North Freezer VF1-EX

Products stored: Frozen Vegetables

Room Length (ft): _____ Width (ft): _____ Area (ft^2): 921

Design Temperature (°F): 0 to -10 Actual Temperature (°F): 6

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10' - 2"

Estimated amount of food stored: 17 Pallets @ 2100 lbs ea.

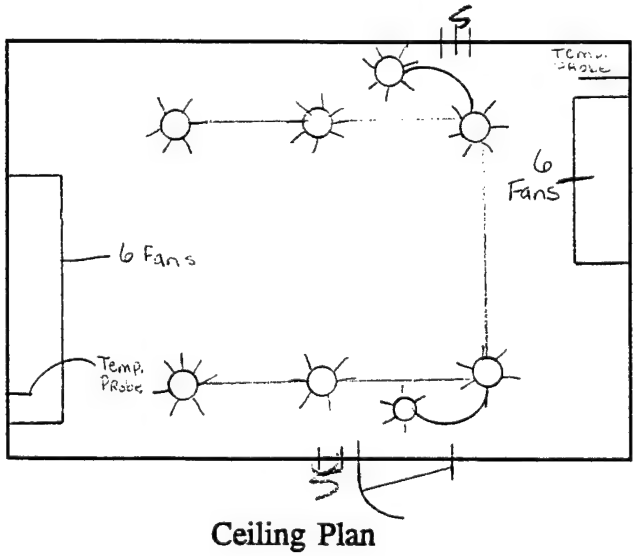
Equipment in Room and Type: _____

Number of Lights: 8 incand. Wattage per bulb: 100

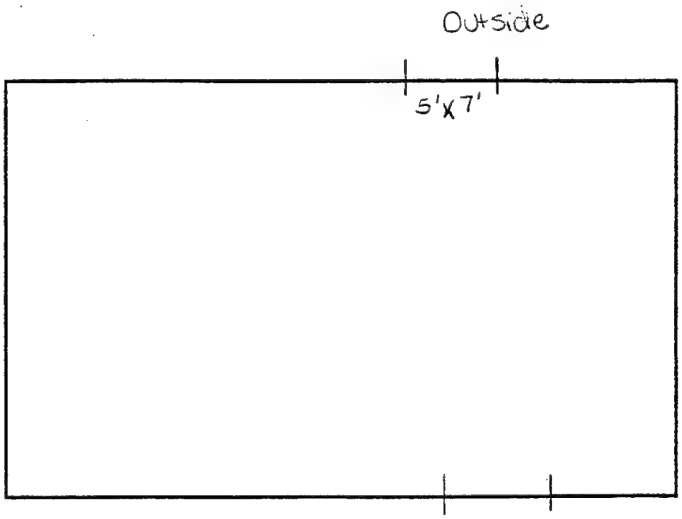
Number of Doors: 2: Gloekler, Erie, PA Door Type: 24 x 60 x 10-6 ser#E2631A

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Blower Data: Bohn Model # LB72 702A
6.8 Amp Fan Motors, 1 ph 17.4 Amps heater, 3 ph.
208, 230 V. Both

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: R. Corry
Date: 9/11/92 Time: 1500

STORAGE ROOM DATA SHEET

Storage room name: Mechanical Room MECRM-EX

Products stored: Refrigeration Equipment

Room Length (ft): 33'10" Width (ft): 18'9" Area (ft^2): ~ 634

Design Temperature (°F): _____ Actual Temperature (°F): 84.2

Location of Temperature measuring device in Room: Center

Ceiling Height (ft): ~ 15'3"

Estimated amount of food stored: none

Equipment in Room and Type: see equipment sheets

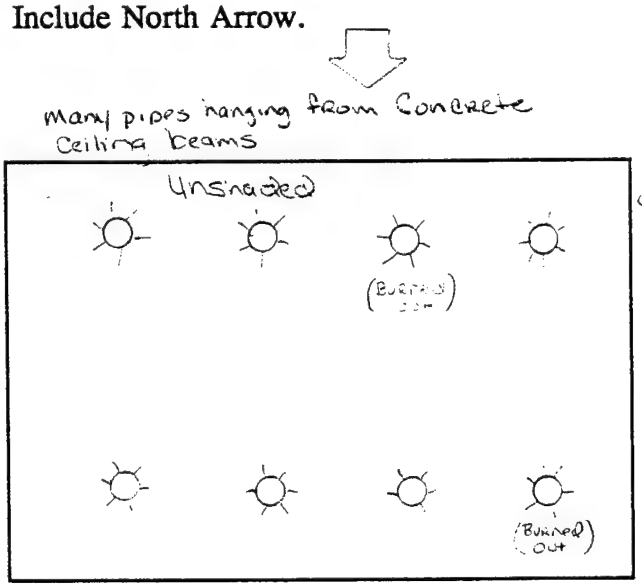
Number of Lights: 8 inc. Wattage per bulb: _____

Number of Doors: 1 double Door Type: Wood & Glass

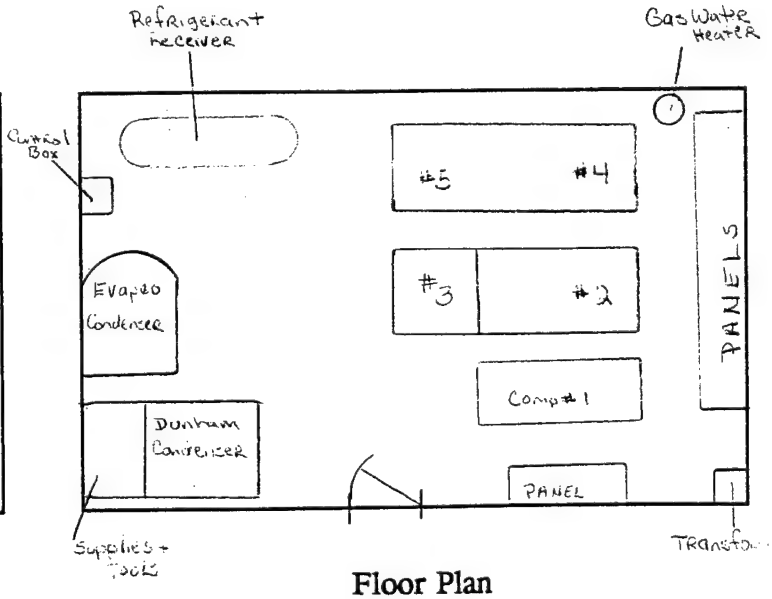
* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: R. Corry
Date: 9/11/92 Time: 1510

STORAGE ROOM DATA SHEET

Storage room name: Boiler Room BLRM-EX

Products stored: Boiler & accessories, water heaters

Room Length (ft): 19'4" Width (ft): 12' Area (ft^2): 232

Design Temperature (°F): n/a Actual Temperature (°F): 80.4

Location of Temperature measuring device in Room: Center

Ceiling Height (ft): 16' 4"

Estimated amount of food stored: none

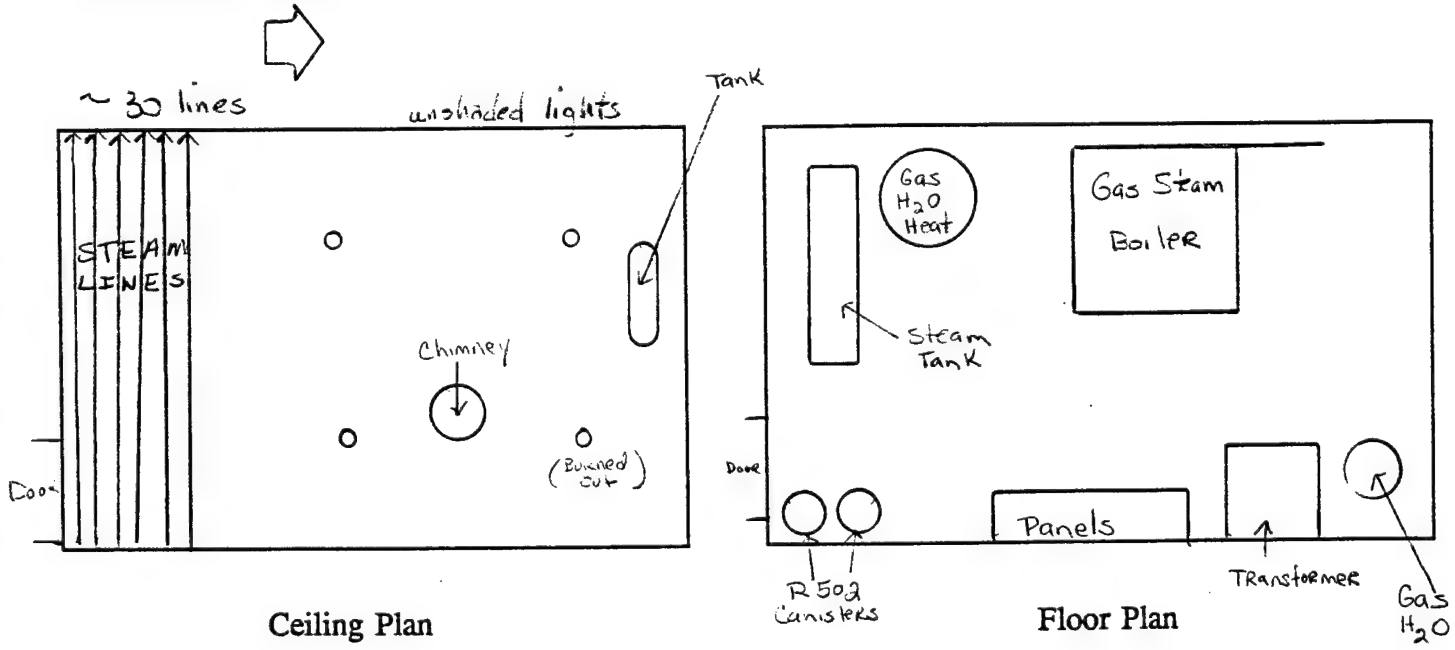
Equipment in Room and Type: see below

Number of Lights: 4 incandescent Wattage per bulb: 100

Number of Doors: 1 Double Door Type: wood & metal louvered

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan

Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: R. Corry
Date: 9/11/92 Time: 1245

STORAGE ROOM DATA SHEET

Storage room name: Locker Room LR-EX

Products stored: none

Room Length (ft): 18' 10" Width (ft): 17' 4" Area (ft^2): ~ 326

Design Temperature (°F): _____ Actual Temperature (°F): 69.6

Location of Temperature measuring device in Room: Center

Ceiling Height (ft): 8' 10"

Estimated amount of food stored: none

Equipment in Room and Type: Bathroom

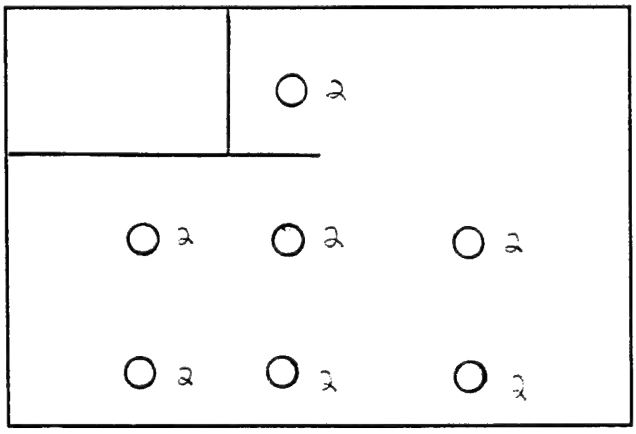
Number of Lights: 14 Wattage per bulb: 100

Number of Doors: 1 Door Type: Office

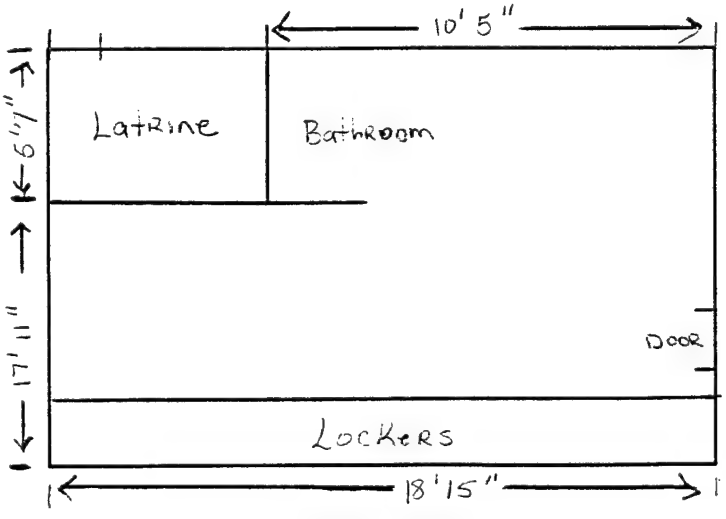
* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: R. Corry
Date: 9/11/92 Time: 1225

STORAGE ROOM DATA SHEET

Storage room name: VET's Office VT OFF-EX

Products stored: n/a

Room Length (ft): 18' 10" Width (ft): 15' 2" Area (ft^2): ~ 286

Design Temperature (°F): _____ Actual Temperature (°F): 69.7 - 70.4

Location of Temperature measuring device in Room: Center - thermocouple

Ceiling Height (ft): 8' 10"

Estimated amount of food stored: none

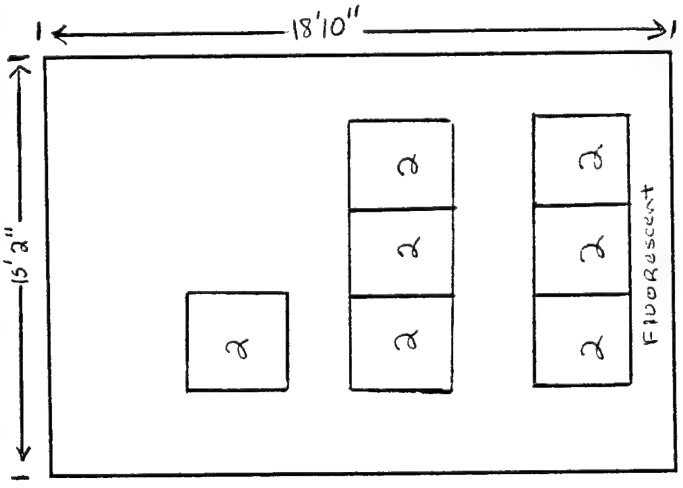
Equipment in Room and Type: none

Number of Lights: 14 fluorescent Wattage per bulb: _____

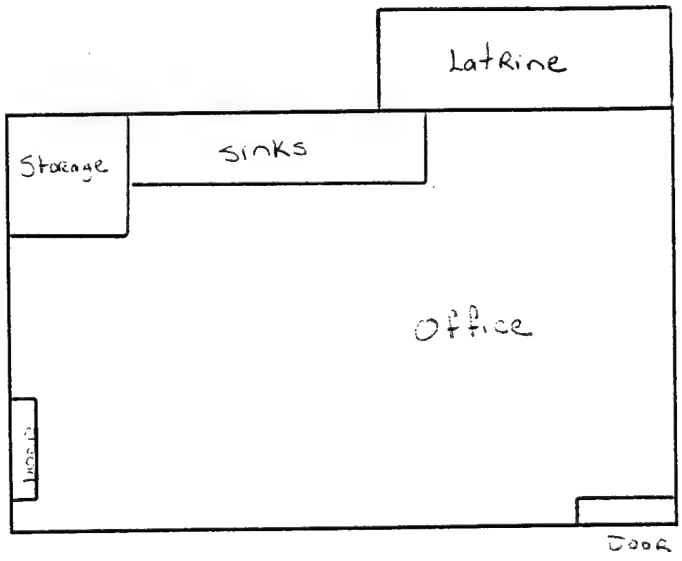
Number of Doors: 2 Door Type: office

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: R. Corry
Date: 9/11/92 Time: 1230

STORAGE ROOM DATA SHEET

Storage room name: Cold Storage Office CSOFF-EX

Products stored: none

Room Length (ft): 18' 10" Width (ft): 18' Area (ft^2):

Design Temperature (°F): Actual Temperature (°F): 70.8

Location of Temperature measuring device in Room: Center - thermocouple

Ceiling Height (ft): 8' 10"

Estimated amount of food stored: none (personal)

Equipment in Room and Type: 1 household refrigerator

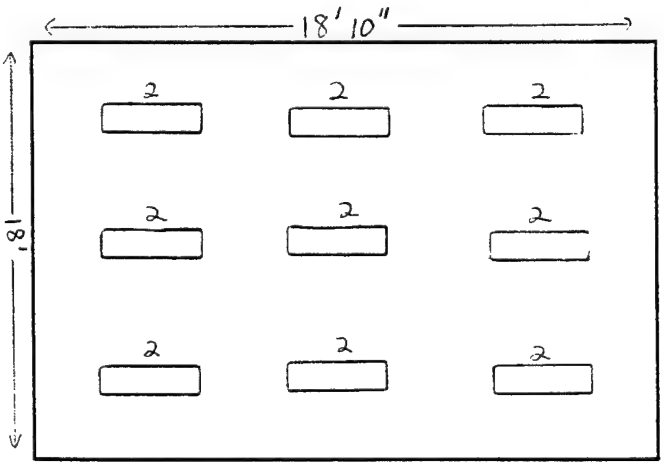
Number of Lights: 36 fluorescent Wattage per bulb: 100

Number of Doors: 2 Door Type: Office

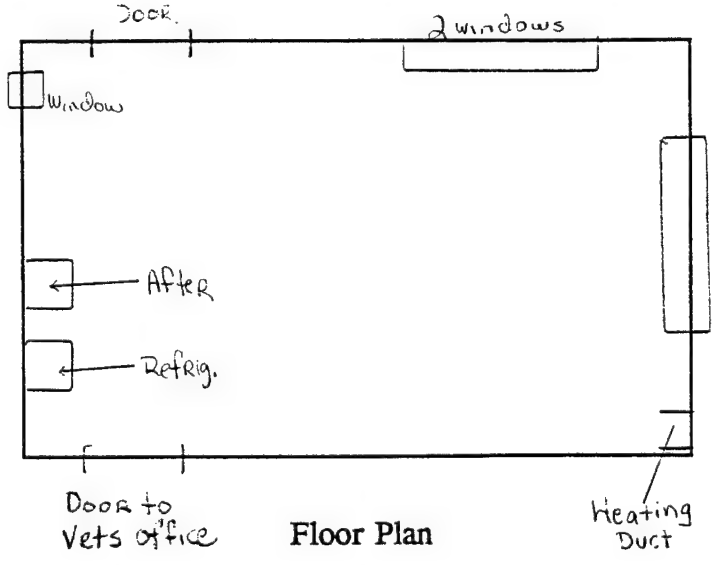
* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/18/92 Time: 1100

STORAGE ROOM DATA SHEET

Storage room name: EC-3 Eggs, Fresh Cheese, Canned Ham EC-3-EX

Products stored: Cheese, Eggs

Room Length (ft): _____ Width (ft): _____ Area (ft^2): 1306.61

Design Temperature (°F): 30 - 35 Actual Temperature (°F): 56

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-6" w/meat racks

Estimated amount of food stored: 26 pallets

Equipment in Room and Type: 2 - units

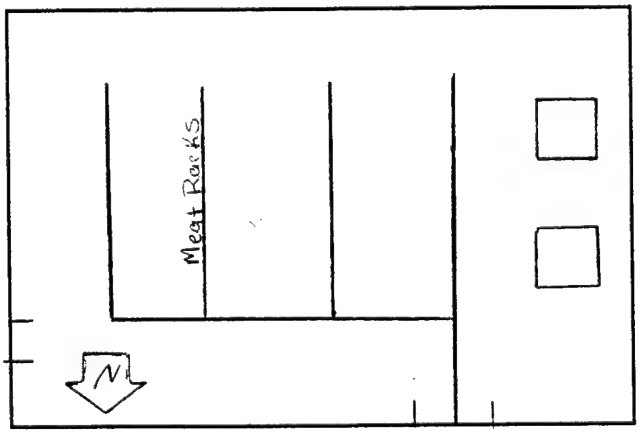
Number of Lights: 20 hooded 5 rows of 4 Wattage per bulb: 100

Number of Doors: 2 5'x7'-8" Door Type: _____

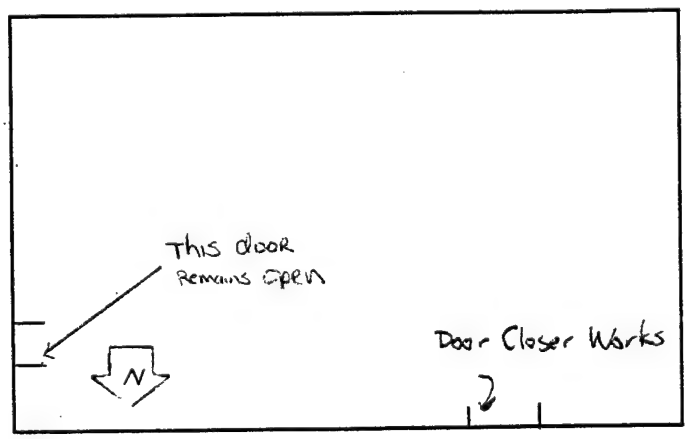
* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1335

STORAGE ROOM DATA SHEET

Storage room name: Latrine - Mini Mart LTNMM-EX

Products stored: none

Room Length (ft): 19'-0" Width (ft): 10'-0" Area (ft^2): 190

Design Temperature (°F): _____ Actual Temperature (°F): 75

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 9' - 0"

Estimated amount of food stored: n/a

Equipment in Room and Type: n/a
3 Over sinks - 1 bulb

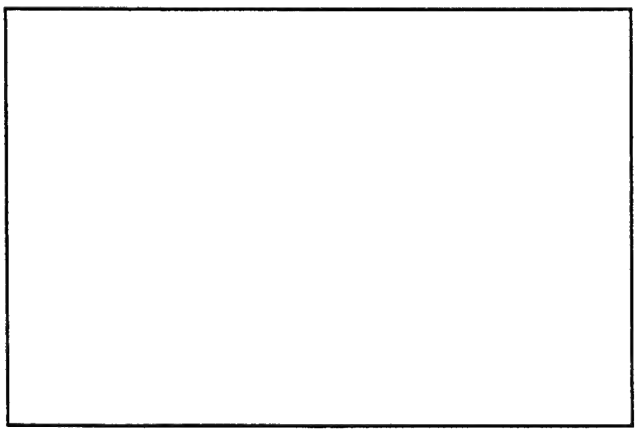
Number of Lights: 2 Overhead - 4 bulbs Wattage per bulb: 100

Number of Doors: 2'-8" x 7'-0" Door Type: Wood w/vent

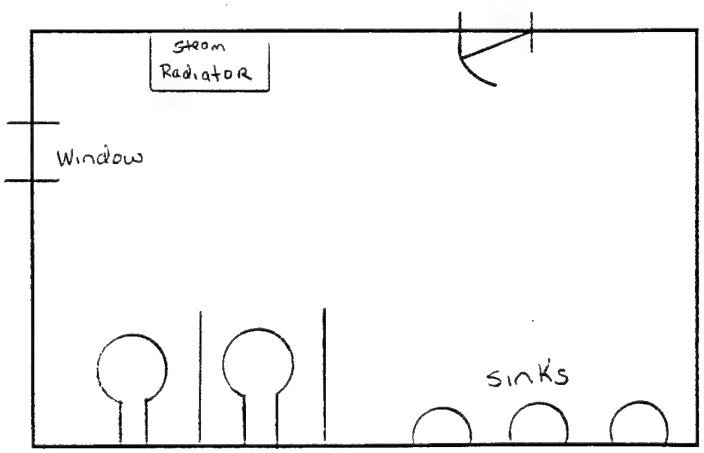
* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1345

STORAGE ROOM DATA SHEET

Storage room name: Mini Mart Locker Room MM-LR-EX

Products stored: Non-Food

Room Length (ft): 19 Width (ft): 10 Area (ft^2): 190

Design Temperature (°F): _____ Actual Temperature (°F): 75

Location of Temperature measuring device in Room: n/a

Ceiling Height (ft): 9'

Estimated amount of food stored: n/a

Equipment in Room and Type: n/a

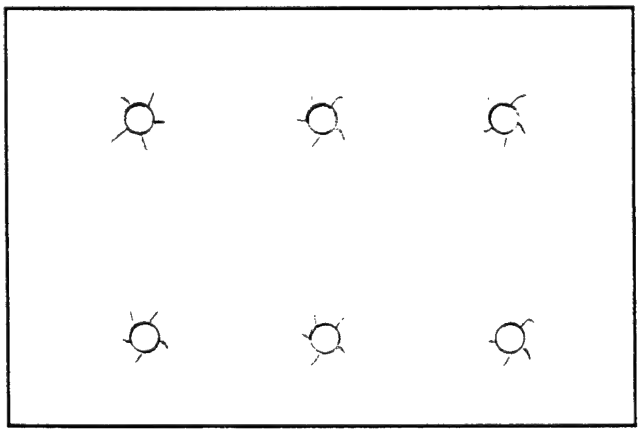
Number of Lights: 6 Wattage per bulb: 100

Number of Doors: 2 Door Type: Wood

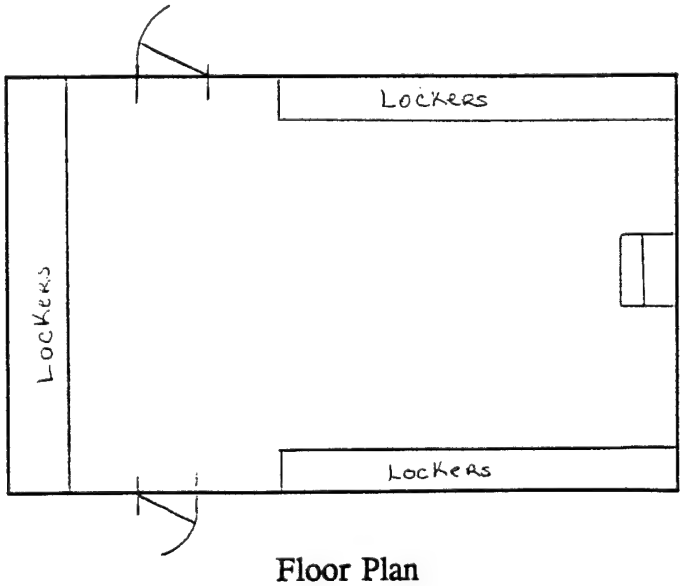
* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1350

STORAGE ROOM DATA SHEET

Storage room name: Mini Mart Check Out MM-CO-EX

Products stored: _____

Room Length (ft): 50.5 Width (ft): 19 Area (ft^2): ~ 960

Design Temperature (°F): _____ Actual Temperature (°F): _____

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10' - 6"

Estimated amount of food stored: none

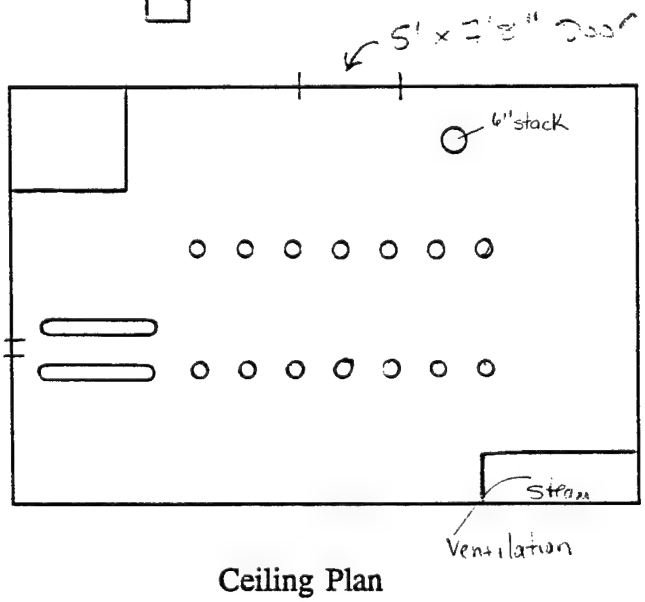
Equipment in Room and Type: _____

Number of Lights: 2-Flourescent, 14-200 watt incand. Wattage per bulb: _____

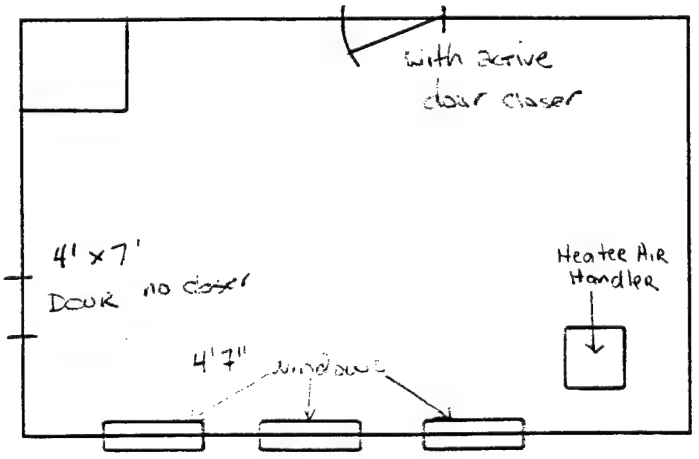
Number of Doors: 2 Door Type: _____

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.)

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1355

STORAGE ROOM DATA SHEET

Storage room name: Mini-Market MM-EX

Products stored: _____

Room Length (ft): 72' Width (ft): 41' Area (ft²): ~ 2952

49.5-58.5 in Room

Design Temperature (°F): 0 Actual Temperature (°F): 10/11.5 Free Standing Unit

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-6"

Estimated amount of food stored: 16 pallets

Equipment in Room and Type: _____

Room: 22 incand. (shaded)

Number of Lights: Freezer: 30-Flourescent, 2-incand. Wattage per bulb: 100

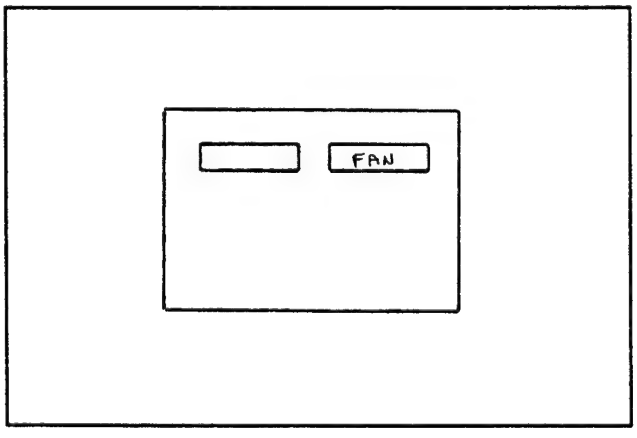
Number of Doors: 4 Door Type: Free Freezer door closers inoperable

* Detail Blowers and Evaporators on Reverse*

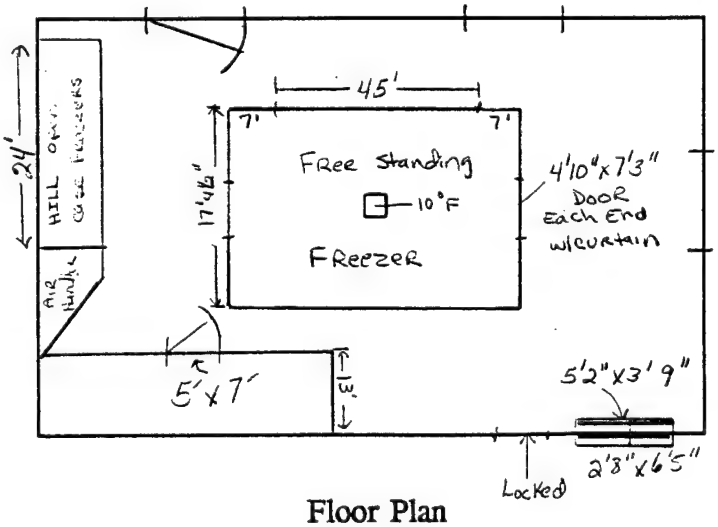
Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Russell Units in Free standing Freezer
mod # AE66-245, SER = G90-1173-11
Fans - 1 Ampica. 230v.
Heaters - 1ph, 2'2.6 Amp, 230v.

Evaporad Model # 18X45C
SER # 65996-1
Free Standing Freezer
39708 Btu 10°
Condensable -10°
W.A. Brown + Sons, Salisbury

Include North Arrow.



Ceiling Plan



Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1430

STORAGE ROOM DATA SHEET

Storage room name: Mini-Mart Egg Room MMER-EX

Products stored: Butter, Margarine, Cheese

Room Length (ft): 12.5 Width (ft): 19.5 Area (ft^2): ~ 244

Design Temperature (°F): _____ Actual Temperature (°F): 44.2

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10'-6"

Estimated amount of food stored: 4 Pallets

Equipment in Room and Type: _____

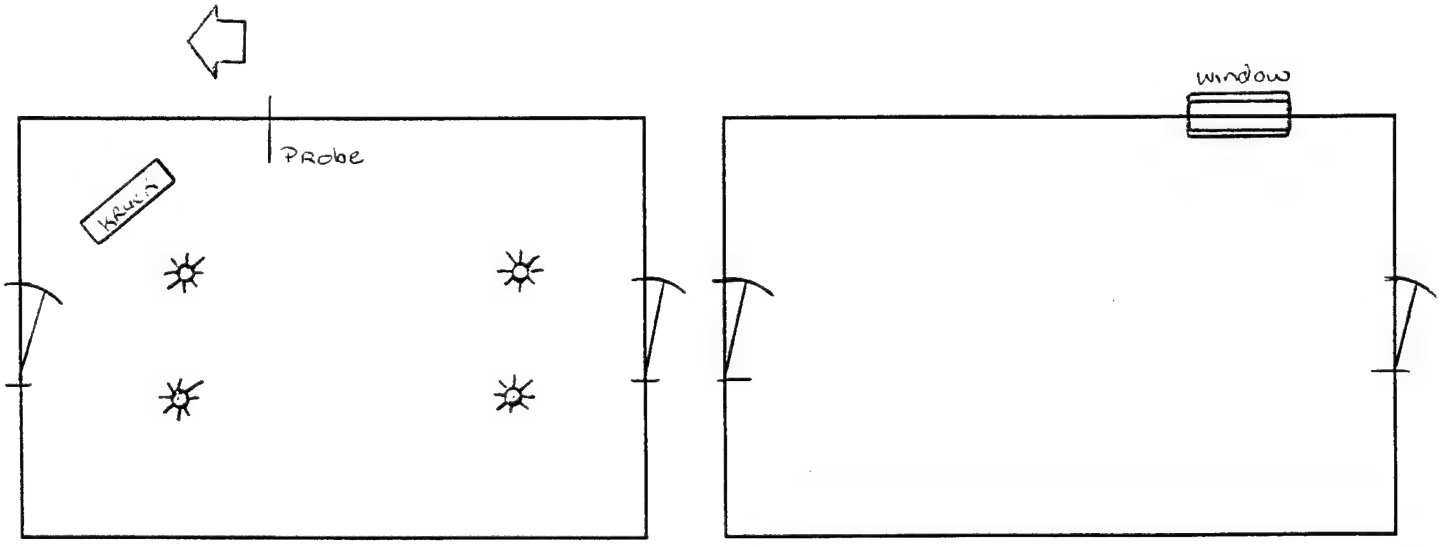
Number of Lights: 4 Incand. (Shaded) Wattage per bulb: 100

Number of Doors: 2 w/air curtains: 5'-0"x7'-9" Door Type: Chase

* Detail Blowers and Evaporators on Reverse*

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Krack mod = BUC950
SER = 74954
2 motors 0.1 HP, 115 V, 6 AMPS

Include North Arrow.



Ceiling Plan Floor Plan

Fort Campbell Energy Study
Project No: 0-4627-0070-0000
Surveyed by: WJR / RWW
Date: 9/11/92 Time: 1435

STORAGE ROOM DATA SHEET

Storage room name: Mini-Mart Hallway MM-HW-EX

Products stored: Idaho Potatoes, Onions, Packaged Ketchup

Room Length (ft): 84' Width (ft): 10.5' Area (ft^2): 882

Design Temperature (°F): _____ Actual Temperature (°F): 52

Location of Temperature measuring device in Room: _____

Ceiling Height (ft): 10' - 7"

Estimated amount of food stored: 7 pallets

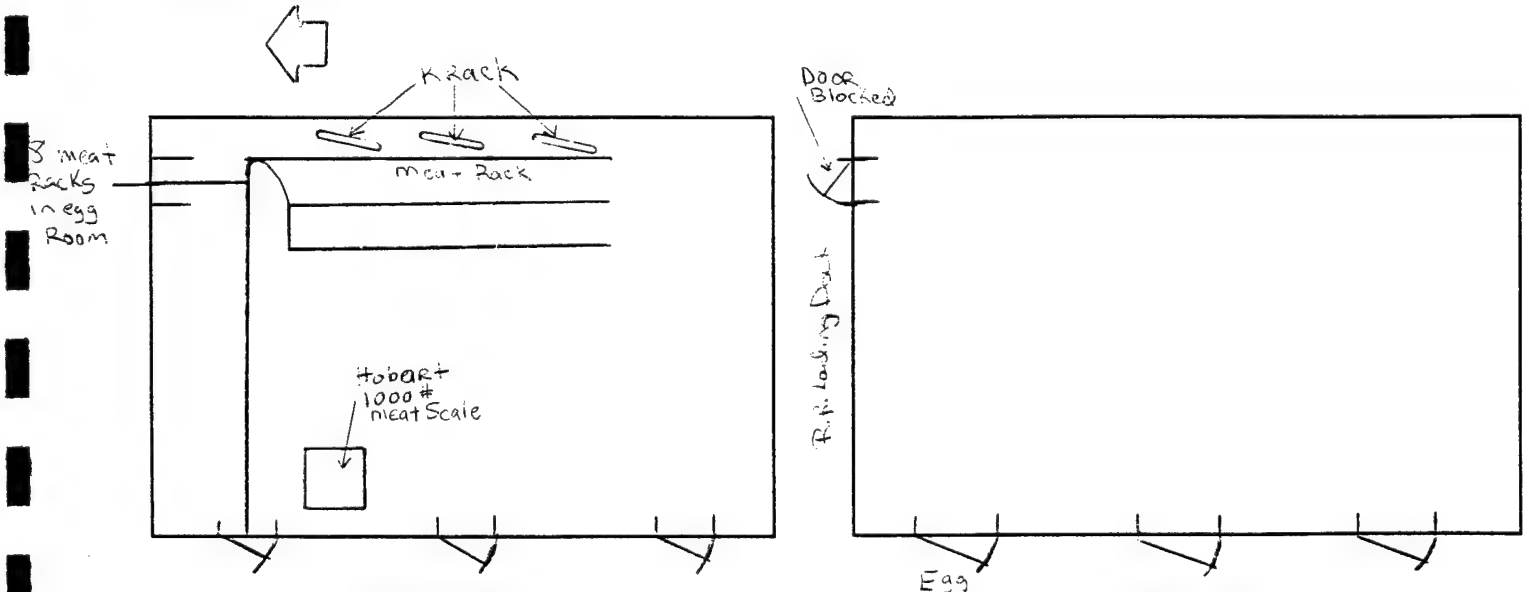
Equipment in Room and Type: _____

Number of Lights: 12 incand. Wattage per bulb: 100

Number of Doors: 4: (5'-0" x 7'-0") Door Type: Chase

Make a sketch here showing dimensions of room, location of door(s), equipment, lights, and all openings (pipe entries, etc.) Krack - 3 units same as egg room, 2 Fans

Include North Arrow.



Ceiling Plan Floor Plan

Ft. Campbell
Cold Storage Facility
Energy Study

APPENDIX 7

ENERGY CONSERVATION OPPORTUNITIES PROJECTED

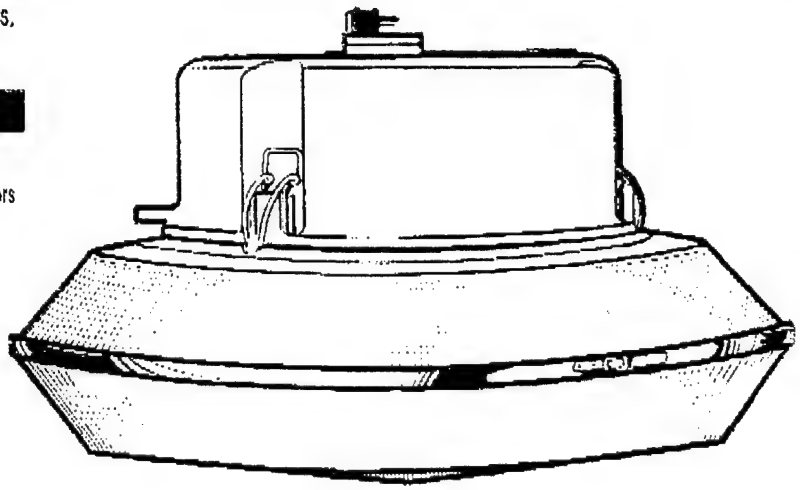
January 1993

VERSAGLOW® 150 and 250 LUMINAIRE

LOW BAY — ENCLOSED

APPLICATIONS

Low mounting height 8-20 ft. (2-6 meter) applications, classrooms, offices, cafeterias, storage rooms.



SPECIFICATION FEATURES

- UL1572 Listed SUITABLE FOR DAMP LOCATIONS
- UL1572 Listed for metal halide lamps in polymeric lamp containment barriers
- UV stabilized injection molded prismatic refractor for low brightness
- Die-cast aluminum ballast housing with electrocoat gray paint finish
- Primary quick disconnect for easy mounting
- Uses energy-conserving high intensity discharge lamps
- Mogul base socket
- Safety chain provisions
- Shipped as components: Ballast, Optical, Mounting Receptacle

ORDERING NUMBER LOGIC

(c) (UL LISTED)

V1G 05 S 0 H 4 EA 1 Q

PRODUCT ID XXX	WATTAGE XX	LIGHT SOURCE X	VOLTAGE X	BALLAST TYPE X	AMBIENT °C X	OPTICAL XX	MOUNTING RECEPTACLE X	OPTIONS XXX
V1G= Versaglow 150 Luminaire V2G= Versaglow 250 Luminaire	05= 50 07= 70 10=100 15=150 (55V) 17=175 25=250	S=HPS M=MH or Merc NOTE: Lamp is base up. Standard: Lamp not included.	0=120/208/240/277 Multivolt 1=120 2=208 3=240 4=277 5=480 D=347 F=120X347	See Ballast and Photometric Selection Table A=Autoreg H=HPF Reactor or Lag K=Hot Restart	4=40 NOTE: 150 watt maximum when used with Versaglow 150 Luminaire (V1G)	EA=Enclosed Acrylic for V2G EL=Enclosed Polycarbonate TA=Enclosed Acrylic Refractor for V1G	Select from Mounting Receptacle Selection Table. Example: 2=¾-in. Pendant, Rigid	8=Time Delay Automatically Switched Quartz F=Fusing (Not available with multivolt or 120X347V) Q=Non-Time Delay Automatically Switched Quartz

Data subject to change without notice

(c) The catalog numbers, options and modifications on this page are UL Listed unless otherwise noted.

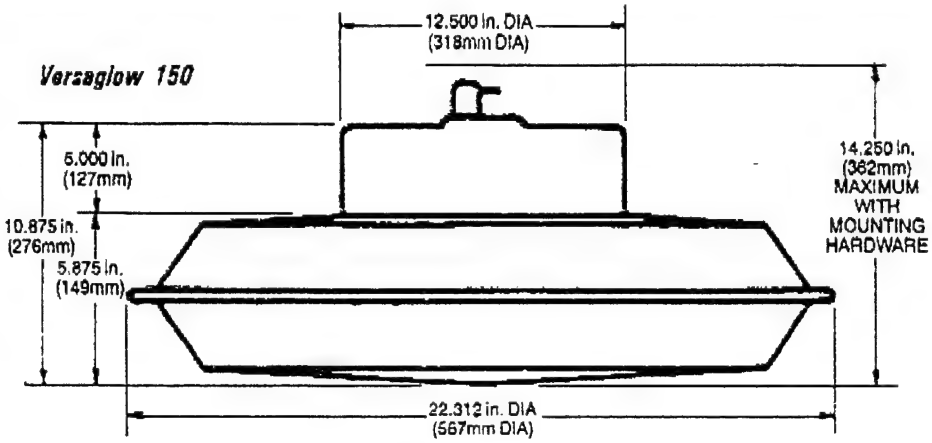
* Registered Trademark of General Electric Company

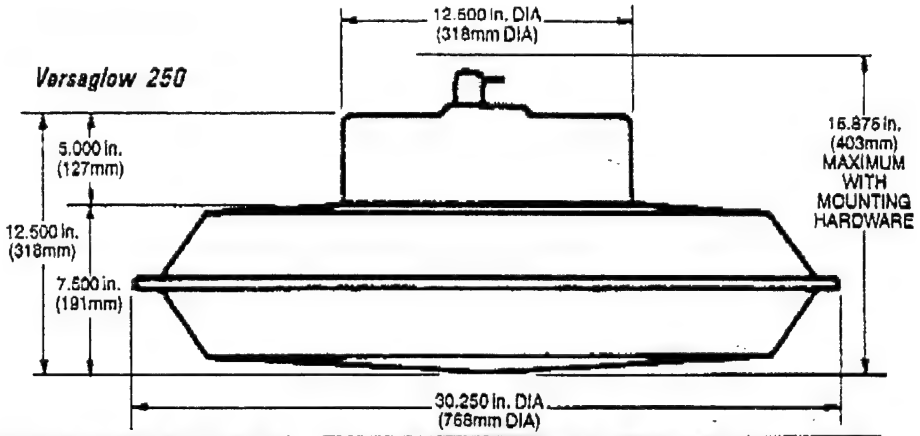
VERSAGLOW® 150 and 250 LUMINAIRE

LOW BAY ENCLOSED

DIMENSIONS

NOTE: Flexible pendant mounting receptacle must be used if unit is not rigidly mounted.





BALLAST AND PHOTOMETRIC SELECTION TABLE

All light sources are clear unless otherwise indicated.

Wattage	Light Source	Ballast Type All Voltages	Spacing Criterion	Photometric Curve Number 35-17-• • •
V1G Versaglow 150 Luminaire				
50, 70, 100, 150 (55V)	HPS	H*, K	1.5	5764
V2G Versaglow 250 Luminaire				
50, 70, 100, 150 (55V)	HPS	H*, K	1.6	5715
250	HPS	A	1.6	5752
175 250	MH (Coated) MH (Coated)	A A	1.6 1.6	5751 5921
175, 250	Merc (Coated)	A	1.6	5753
NOTE: *480 volt "H" not available—use "M" Mag-Reg				

DATA

Approximate Net Weight	22-36 Lbs	10-16 Kgs

MOUNTING RECEPTACLE SELECTION TABLE

NOTE: Flexible pendant mounting receptacle must be used if unit is not rigidly mounted.

1= Ceiling **(MPM-C)**
2= ¾-in. Pendant, Rigid **(MPM-3PR)**
5= ¾-in. Pendant, Flexible **(MPM-3PF)**
6= Outlet Box Cover **(MPM-OBC)**

REFERENCES

See Page 1900 for start of Accessories
See Page 1940 for Start of Component Ordering Number Logic

Kelso-Regen Associates,
Consulting Engineers
6709-B Kingston Pike
KNOXVILLE, TENNESSEE 37919
Phone 588-5348

PROJECT NO _____ PAGE _____ OF _____

PROJECT COLD STORAGE FACILITY - FT. CAMPBELL

BY RWK DATE _____

TITLE ANALYSIS OF ELECTRICAL COST SAVINGS FROM USE OF PEAK-SHAVING EMERGENCY GEN.

(ITEM 9 OF YOUR LETTER, ITEM 13 OF PRELIM. REPORT)

APPARENT ELECTRICAL PEAK LOADS

SPACE	BASE LOAD	PEAK LOAD
MECHANICAL ROOM	83 KW	119 KW
BATTERY ROOM	10	15
BOILER ROOM	28	36
TOTALS	121 KW	170 KW

PEAK-SHAVING GENERATOR CAPACITY 170 - 121 = 49 KW

COST OF 50 KW DIESEL GENERATOR	$15,125
100 AMP TRANSFER SW	2617
WEATHERTIGHT HOUSING	850
FUEL TANK	500
CONCRETE PAD, WIRING, INSTALLATION	3000
TOTAL	$22,092

OPERATING COST

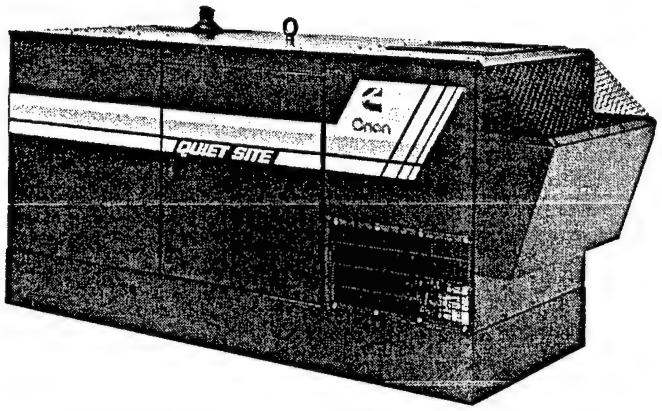
$$2000 \text{ HR/YR} \times 50 \text{ KW} \times 3413 \frac{\text{BTU}}{\text{KWH}} \times \frac{1}{0.80 \text{ GEN. EFF.}} \times \frac{1 \text{ GAL}}{140{,}000 \text{ BTU}} \times \frac{1}{0.3 \text{ EFF.}} = 10{,}000 \frac{\text{GAL}}{\text{YR}}$$

OR ABOUT $10,000/YR

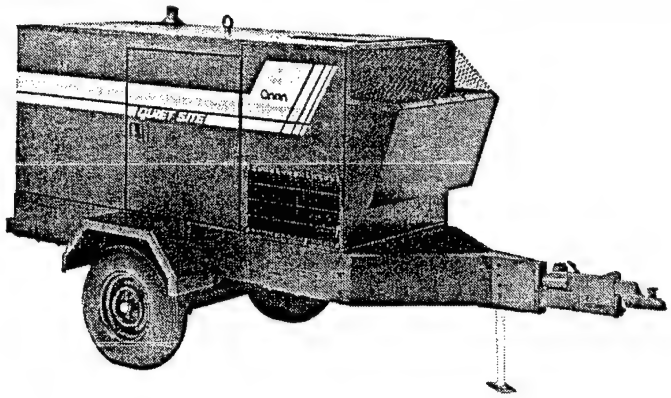
POSSIBLE SAVINGS 50 KW × $12/KW-MO. × 12 MO. = $7200/YR.

60 QSGCB 60 Hz
50 QSGCB 50 Hz
Quiet Site™ Diesel-Fueled Generator Set

Factory tested under full load at 23 feet (7 meters):		STANDBY	PRIME
60 Hz: 68 dBA	60 Hz	60 kW 75 kVA	55 kW 69 kVA
50 Hz: 63 dBA	50 Hz	50 kW 63 kVA	45 kW 56 kVA



Standard package for permanently-installed standby or prime power applications.



Optional trailer package and voltage reconnection panel for mobile power applications.

Quiet Site™ Generator Set

- **Single-source design, manufacturing and testing of all set components and accessories by Onan Corporation.**
- **Accepts 100% of nameplate kW rating in one step, in compliance with NFPA 110, Paragraph 5-13.2.6.**
- **Engine torque-matched excitation system provides quick recovery from transient speed dips.**
- **Low reactance generator design offers low waveform distortion with non-linear loads and provides excellent motor starting capabilities.**

Features

SOUND-ATTENUATED ENCLOSURE
Lockable; reduces noise to levels substantially lower than standard designs; critical grade silencer enclosed in housing.

ENGINE
Cummins direct injection, 4-cycle diesel engine.

ALTERNATOR
Revolving field alternator, brushless, 12 lead, reconnectible, broad range voltage.

VOLTAGE REGULATOR
Electronic voltage regulator provides precise regulation and underfrequency compensation.

COOLING SYSTEM
High ambient 122° F (50° C) system.

FUEL TANK
Integral 40 gallon (151 liters)

PAINT FINISH
Electrodeposition primer treatment for maximum finish durability in harsh environments.

SINGLE POINT LIFTING EYE

Generator Set Testing

The Prototype Test Support (PTS) program is our commitment to verifying the integrity of our designs and products.

Before the generator sets are put into production, prototype models are subjected to demanding tests with typical/atypical loads and transients anticipated in service.

Production models earn the PTS seal only after meeting the performance criteria established by the program.

Single-Source Warranty

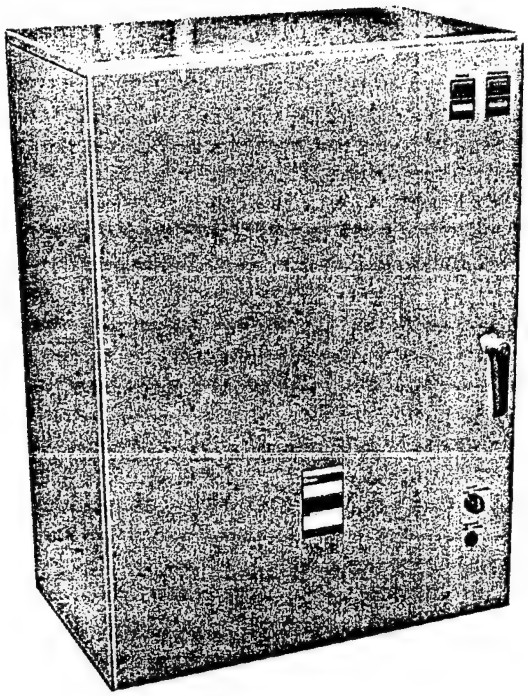
All generator set components and systems are covered by a limited one-year warranty. Optional two- and five-year* extended programs are available.

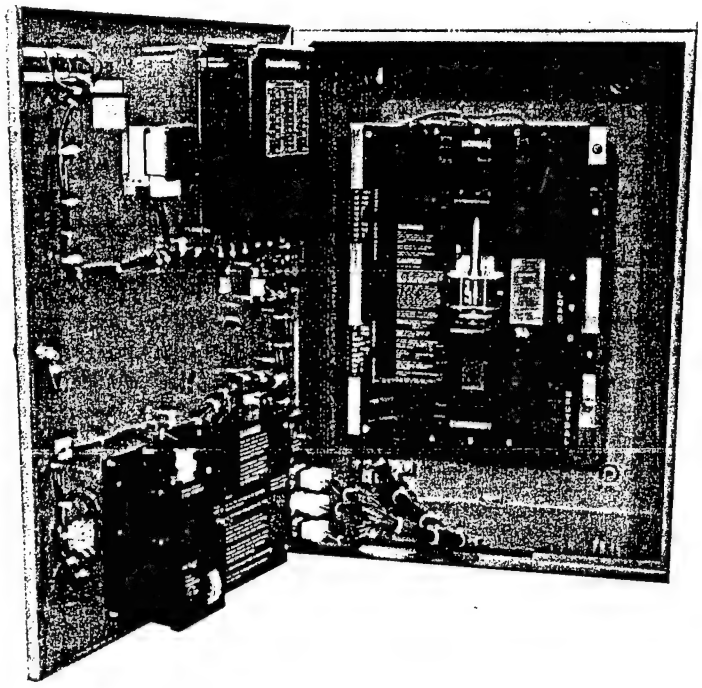
Standard Models are CSA certified.

*Available on emergency/standby applications only.

OT III™ Automatic Transfer Switch
40 to 3000 Amperes

Onan





Application Flexibility

OT III™ Automatic Transfer Switches transfer loads between utility and generator set, utility and utility, or generator set and generator set. Available in 3- or 4-pole/switched neutral models.

Power Sentry Electronic Control

Reliable electronic control with system surge voltage isolation, all phase monitoring on each power source; four standard time delays and diagnostic LED's.

- Optical isolation on all logic inputs.
- Relays used on all outputs.
- High isolation transformers for AC power inputs.
- LED lamps verify control status.
- Field adjustable voltage sensors and time delays.

Linear Operator

Provides simple, reliable, positive, fast acting electric transfer during automatic operation.

Positive Interlocking

Mechanical and electrical interlocking to prevent source-to-source connection through the power or control wiring.

Main Contacts

Heavy duty silver alloy contacts with separate arcing surfaces and multileaf arc chutes. Rated for total system transfer including overload interruption. High pressure contact design withstands high fault currents without interruption.

Assembly Features

UL Listed cabinets. Plug connections between switch and control to facilitate service. UL Listed CU-AL terminals. Door mounted controls provide easy access for adjustments and service. Ample space for field power and control connections. Terminal markings compatible with generator set.

Agency Approvals

Listed to UL 1008. All accessories UL listed for factory or field installation. Complies with NEMA ICS 2-447, and conforms to applicable requirements for NFPA 70, 99 and 110. CSA certified.

Manual Operation

Permanently attached manual operating handles, shielded termination, and over-center type contact mechanisms allow safe, manual operation under load. (40 - 1000A switches).

US Army Corps of Engineers

Military Programs

Engineering Bulletin

No. 92-02 Issuing Office: CEMP-ET Issue Date: 31 March 1

SUBJECT: Utilization of Generators for Peak Shaving

Applicability: INFORMATION

1. Significant cost savings may be realized by utilizing standby generators to reduce a facility's demand charges by peak shaving. Chapter 12 of the Architect Engineer Instruction, Design Criteria (AEI), requires that an economic analysis be performed, to determine if it is cost effective to install a demand controller for peak shaving, if the following conditions are met:

a. The facility has at least 200kW of standby generation, or

b. A central supervisory, monitoring and control system exists or is planned to be installed at the facility.

2. The economic analysis should address factors such as system installation costs (i.e., equipment modifications required to support using the standby generators for peak shaving), operation and maintenance costs, and major replacement costs. Software programs are available to assist in performing the economic analysis.

3. Other factors which should be considered when investigating the feasibility of using existing generators for peak shaving include:

a. Is the use of the standby generators for peak shaving consistent with the mission of the facility?

b. Will personnel be available to operate and maintain the generator plant as required?

c. How will the generators be interfaced with the facility electrical system to support peak shaving? Will the system parallel with commercial power? Is operation to be manual or automatic?

4. The next update of the AEI will include amplifying and clarifying information regarding this application of standby generators.

RICHARD C. ARMSTRONG, P.E.
Chief, Engineering Division
Directorate of Military Programs

Prepared in accordance with AR 25-30 by HQUSACE Directorate of Military Programs, 20 Massachusetts Ave., NW, Washington, DC 20314

OGDEN

Job Name: Ft Campbell
Job Number:
Title:
Computed by: LB Checked by:
Date: 11/17/92 Sheet: 1 Of:

BUILT UP (ROLL ASPHALT)

TASK 1 - OVERLAY THE EXISTING ROOF WITH A LIGHT COLOR BUILT UP ROOF

NEED RECOVERY BOARD SAYS RAY - KBJM

DIXIE ROOFING
LARRY ROSSON
[redacted]
938-9880

AREA 227.33 x 110.0 = 25006 SF

EPDM ROOF -

ASPHALT + MOP ON -

ASSUMES ROOF OK & CAN PENETRATE WITH SCREWS

SCENARIO: OVERLAY W/ ½" FIBERBOARD ADHERED EPDM APPLIED COAT WITH LIGHT REFLECTIVE } $2.50-3.25/SF

MOP ON ASPHALT + ROOF FELT MUCH CHEAPER, BUT WON'T LAST AS LONG SAYS LARRY

FROM MEANS 1993 (51ST EDITION)

CAT/PAGE LOCATION	ITEM	COST/SF
072-203-0300/169	½" FIBERBOARD	.66 ?
075-302-3800/179	ADHERED EPDM 45 MILS	1.33
?	LIGHT REFLECTIVE .51	1.20 ?
		$1.99 +

FOR $2.75/SF - TOTAL = $68,776 ±

Use cover costs only 1.33 x 25000 = 33,258
≈ 33,350

OGDEN

Job Name: FORT CAMPBELL
Job Number:
Title:
Computed by: LB Checked by:
Date: 11/17/92 Sheet: 3 Of:

TASK 3 - INSTALL FLOOR INSULATION BENEATH MEAT FREEZER ONLY.

FREEZER FLOOR SLAB SECTION

TOP SLAB
6" CONCRETE
6" INSULATION ← R VALUE?
CONCRETE
TOP OF 4'± CRAWL SPACE

FREEZER ROOM AREA = 40' × 85 ± = 3400 SF
"FROZEN FOODS ROOM"

A.G. STEINS — DOW BLUE BOARD 2" — R=10 .56
"BARM" FASTENERS / PLATES ?
525-5363 GLUE $1.60/gal. .10
MATERIALS (LESS FASTENERS) $0.66

FROM MEANS 1993 072-116-1900/page 168

2" BLUE BOARD - MAT .66
LAB .26
O&P .23
GUESS AT FASTENERS 0.10
1.25/SF OR ~.13 FOR EACH I R

FOR $1.25/SF — TOTAL = $4250.00

THIS IS FOR INSTALLATION SO COST TO INSTALL IN CRAWL SPACE MIGHT BE DOUBLE LABOR, OR $1.51 SF
THEN TOTAL = $5,134.00

OGDEN

Job Name: FT CAMPBELL
Job Number:
Title:
Computed by: LB Checked by:
Date: 11/18/92 Sheet: 4 Of:

TASK 4 - INSTALL MINIMUM 2" PANEL IN EACH ROOM. THERMAL INSULATION

4 WALLS -	MEAT PROCESSING 45°F - 224 LF - 23 LF DOORS	=	201
4 WALLS -	FRUIT & VEG - 35°F - 136 LF - 5 LF DOORS	=	131
N WALL	EGG & DAIRY - 35°F - WALL ONLY 33 LF - 5 LF DOOR	=	28
N WALL, W WALL	MEAT CHILL - 32°F - 2 WALLS ONLY - 89 LF - 10 LF DOOR	=	79
N, S, E WALLS	MEAT RECEIVING - 35°F - ONLY 3 WALLS - 104 LF - 5 LF DOORS	=	99
N, E, W WALLS -	RECEIVING & ISSUE - 35°F - ONLY 3 WALLS - 126 LF± - 20 LF DOORS	=	106
4 WALLS	FROZEN FOODS - 0°F 234 LF - 10 LF DOORS	=	224
4 WALLS -	VENTILATED STORAGE 50°F 210 LF - 10 LF DOORS	=	200
4 WALLS -	ICE ROOM - 26°F 70 LF - 7 LF DOORS	=	63
4 WALLS -	PROCESSED MEAT 28°F 112 LF - 10 LF DOORS	=	102
N, E, W. WALLS -	ISSUE 35° - 3 WALLS ONLY 53 LF - 10 LF DOORS	=	43
			1276 LF

AVG CEILING HT = 10.5 FEET

MEANS 1993 (51ST EDITION)

072-116-1640 ISOCYANURATE 1" THICK - R 7.2 $.89/SF
(FOIL FACED, BOTH SIDES)

FOR $0.89/SF - 1276 X 10.5 X 0.89 WALLS = 11,924 ±
16321 X 0.89 CEILINGS = 14,525 ±
$ 26449 ±

072-116-1660 page 168

FOR 2" PANEL (R 14.4)

FOR 1.43/SF = 29,719 SF @ 1.43/SF = $ 42498. ±

CEILING AREA ± (117 X 41) + (95 X 45) + (21 X 83) + (38 X 83) + (98 X 24) = 16321 SF ✓
4797 + 4275 + 1743 + 3154 + 2352 →

GORDON HEINS
525-5363

2" BLUE BOARD $0.50/SF (R 10.8) SAYS GORDON

USE MEANS
072-116-1900 / page 168

FOR 1.13 SF - TOTAL COST = 29719 X $1.13 = $33,600 ±